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ABSTRACT

Alcohol on college campuses is not a new problem, but recent concerns have centered on heavy episodic drinking, binge drinking. To address these concerns, the National Advisory Council on Alcohol Abuse and Alcoholism established two panels of nongovernmental experts to help develop a national research agenda. This report represents the work of one of these panels, the panel on Contexts and Consequences. It is based on 12 commissioned, peer-reviewed papers by experts in the field and extensive discussion about those papers. Panel findings show that college students vary greatly in their use of alcohol and their beliefs about its positive and negative consequences, but two major drinking patterns appear dominant among college students: drinking related to impulsivity, disinhibition, and sensation-seeking, and drinking to manage negative emotional states. The Panel identified a number of strategies to reduce student alcohol consumption. These include better research on student drinking, attention by college administrators to policies that inadvertently encourage student drinking and disciplinary policies, and possible mixed messages communicated by accepting sponsorships or gifts from the alcohol industry. The Panel also makes recommendations for the research community and the National Institute of Alcohol Abuse and Alcoholism. (Contains 8 figures and 192 references.) (SLD)

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HIGH-RISK DRINKING IN COLLEGE:

What We Know and What We Need To Learn

Final Report of the Panel on Contexts and Consequences

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Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism
National Institutes of Health
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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High-Risk Drinking in College:
What We Know and What We Need To Learn

Final Report of the Panel on Contexts and Consequences

National Institute on Alcohol Abuse and Alcoholism
National Advisory Council on Alcohol Abuse and Alcoholism
Task Force on College Drinking

April 2002

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EXECUTIVE SUMMARY

"Battle of the Binge: A Fatal Night of Boozing at..."

The newspaper headline above is a college administrator's worst nightmare. Behind its attention-grabbing words is a major public health problem: excessive use of alcohol by college students. The legal drinking age in the United States is 21, but heavy drinking by underage college students—and by those who are age 21 or older—is widespread, dangerous, and disruptive. Indeed, U.S. college presidents have identified alcohol use as their number one campus-life problem.

Excessive drinking among college students is associated with a variety of negative consequences that include fatal and nonfatal injuries; alcohol poisoning; blackouts; academic failure; violence, including rape and assault; unintended pregnancy; sexually transmitted diseases, including HIV/AIDS; property damage; and vocational and criminal consequences that could jeopardize future job prospects.

AN ENTRENCHED PROBLEM

Alcohol use on college campuses is not a new problem; it has been documented in the United States for at least 50 years. However, recent concerns have centered on heavy episodic drinking, a potentially dangerous practice often termed "binge drinking," and usually defined as consuming five drinks or more in a row for men and four drinks or more in a row for women. According to this definition, about two out of five college students have engaged in binge drinking in the past 2 weeks. An additional two out of five college students drink—but not to excess—while one in five does not use alcohol at all.

In recognition of the serious and sometimes fatal consequences of alcohol consumption among college students, the National Advisory Council on Alcohol Abuse and Alcoholism, National Institutes of Health, established two panels of nongovernment experts to help the Institute develop a national research agenda to better address the problem. The panels included college presidents and administrators, well-known alcohol researchers, and students. The two panels are Contexts and Consequences (Panel 1) and Prevention and Treatment (Panel 2).

This report represents the work of the Panel on Contexts and Consequences and is based on 12 commissioned, peer-reviewed papers by experts in the field and extensive discussion among panel members and the authors of the papers. It focuses on what is known about drinking in college and its consequences and on gaps in knowledge that need further study. The report also places a special emphasis on heavy drinking, including binge drinking, because of its potentially serious consequences.

Because colleges vary widely in their drinking rates, it would be inaccurate to characterize all colleges as having an equally urgent drinking problem. But among college students who do drink heavily, the problem is serious: the two out of five students who engage in binge drinking risk a wide range of alcohol-related consequences, including grave injuries and death.

Student Alcohol Consumption: Multiple Influences

The Panel found that on many college campuses, heavy drinking is interwoven overtly or subtly throughout the culture of the institution. As a result, students perceive this drinking pattern as the social norm rather than as unhealthy and potentially destructive behavior. Research consistently shows that there is no one cause of excessive alcohol use by college students, and the Panel thought that it would be naive and misleading to adopt a simplistic view of, or approach to, this problem.

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College student drinking is the product of many factors working together. Among them are:

- Students' value systems and personalities;
- Students' expectations regarding alcohol's effects (whether good or bad);
- Genetic predisposition, often reflected in a family history of alcoholism;
- Roles and influence of family background and peers;
- Social integration of drinking into college life;
- Social context in which drinking takes place (e.g., on- or off-campus parties, on- or off-campus bars);
- Marketing mechanisms such as reduced-price drink specials and promotional efforts;
- Economic availability of alcohol, including its retail price and the amount of students' disposable income;
- Legal availability of alcohol;
- Social and institutional structures, including law enforcement; and
- Public policy.

Developmental processes: Drinking problems among college students are also closely tied to developmental processes. Binge drinking rates are lower at younger ages, increase in later adolescence, and drop off in the mid-twenties.

The college years are a time of transition, involving challenges and changes in identity, social relationships, and living arrangements. However, these transitions also affect noncollege peers, suggesting that what is often interpreted as a campus-based problem may be attributable, in part, to the broader social and biological processes that characterize late adolescence and early adulthood in general. Factors such as greater personal freedom and independence, greater involvement in social and dating relationships, and freedom from the responsibilities of marriage and family life appear to be intricately linked to greater alcohol involvement.

Elevated drinking levels: College drinking occurs at a stage in life when drinking levels are generally elevated. The age period from 19 to 24 is associated with the highest prevalence of periodic heavy alcohol consumption during the life span (Johnston et al., 2001b). Although, on average, college students may drink on fewer occasions than their noncollegiate peers, they drink heavily (e.g., five or more drinks in a sitting) on a more frequent basis than nonstudents, placing them at especially high risk for the consequences of heavy consumption.

Preexisting drinking problems: Because colleges and universities are the social institutions that help many youth make the transition from adolescence to adulthood, they often become the playing field on which the developmental problems of this life stage, including alcohol misuse, unfold. Panel members pointed out that the drinking patterns of some college students represent the continuation of behavior that began during high school or even earlier. When these problems emerge at age 18 or 19, they are labeled "college problems," although they may actually be "high school" or "middle school problems." Viewed from this perspective, while the college experience may serve to "identify" or, in some cases, amplify excessive drinking, it does not necessarily cause it.

Aspects of campus life supporting drinking: Research does, however, suggest that there are aspects of certain college environments that may support or facilitate drinking among students. These factors

include commingling of students under the legal drinking age of 21 with those who can drink legally, substantial amounts of unstructured time, and student-oriented alcohol advertising.

College student drinkers: Research shows that:

- Male college students tend to drink more than female college students;
- White college students tend to drink more than their African-American and Hispanic peers;
- Members of fraternities and sororities tend to drink more than students who do not participate in the Greek system;
- College athletes tend to drink more than peers who are not involved with campus-based sports; and
- As a group, college students are less likely to use drugs than their noncollege peers.

College students vary greatly in their use of alcohol and their beliefs about its positive and negative effects. Studies show that two major drinking patterns appear dominant among college students: (1) drinking related to impulsivity, disinhibition, and sensation-seeking; and (2) drinking to manage negative emotional states, such as depression.

Multiple Negative Consequences

The negative consequences of excessive drinking can be severe for both those college students who drink and those around them.

Personal consequences: Students who drink heavily may experience a range of personal consequences that include missing class, academic difficulties, dropping out of school, problems with friends, health problems, and unprotected or unwanted sex. Excessive use of alcohol can also increase the likelihood that students will engage in high-risk sex, behave aggressively, or perpetrate or experience sexual assault. These consequences are highlighted because they can have severe, long-term repercussions including contracting a sexually transmitted disease, becoming pregnant unintentionally, developing an arrest record, or living with the emotional devastation caused by rape.

Research clearly demonstrates that heavy alcohol use by college students is associated with ***high-risk sexual behavior.*** Alcohol impairs information processing and reasoning and heightens the salience of simple cues to action (such as sexual arousal) while blunting the more distal consequences of behavior (such as the risk of HIV infection). Students who drink excessively are two to three times more likely to have had multiple sexual partners in the past month than those who drink responsibly. Similarly, drinking on a first date is associated with a twofold to threefold increase in the probability of having sex on that date.

Data also show that alcohol and ***physical and sexual aggression*** are linked. Aggressive college students tend to drink more, but it may also be that heavier use increases the likelihood of aggression. At least 50 percent of college student sexual assaults are associated with alcohol use. Typically, both parties in such situations have been drinking when the sexual assault occurs. Alcohol-related sexual assault is underreported, primarily because of the misplaced shame and stigma that surround this violent and personal crime.

In addition, approximately one in three 18- to 24-year-olds admitted to emergency rooms for ***serious injuries*** is intoxicated. Heavy alcohol use is also associated with homicides, suicides, and drownings.

The link between excessive alcohol consumption and unsafe driving is well known. About one-half of all fatal ***traffic crashes*** among those aged 18 to 24 involve alcohol; many of those killed in this age group are college students. Alcohol can slow a driver's reaction time, affect concentration, interfere with steering, and impair response to pedestrians and traffic signs and signals.

Secondhand effects: Noise and property damage, vomit, and unsightly litter are common byproducts of a night of binge drinking on campus. Some researchers term these consequences "secondhand effects," because they are similar to the secondhand smoke from tobacco use (Wechsler et al., 1998). More than one-half of college administrators from schools with high levels of excessive drinking report problems with vandalism and property damage. In addition, students who drink excessively are more likely to physically or sexually assault other students.

THE COLLEGE SCENE

Today, there is much heterogeneity in college experiences; only about 13 percent of all undergraduate students live on campus, and 35 percent are enrolled part-time. Some first-year students who live on campus may be at particular risk for alcohol misuse. Anecdotal evidence suggests that the first 6 weeks of enrollment are critical to first-year student success. Because many students initiate heavy drinking during these early days of college, the potential exists for excessive alcohol consumption to interfere with successful adaptation to campus life. Unfortunately, many alcohol prevention programs do not target this early, critical, high-risk situation.

College organizational factors are also related to student drinking. For example, historically Black colleges and women's colleges tend to have lower rates of alcohol use, while colleges with a Greek system and colleges that place a heavy emphasis on athletics tend to have higher rates of alcohol use. Commuter colleges and 2-year institutions tend to have lower alcohol consumption rates than noncommuter schools and 4-year institutions. In terms of size, students at smaller colleges tend to drink more than students at larger schools.

U.S. laws require that colleges and universities that receive Federal funding develop an alcohol and drug education policy. In addition to laws, ethical and social obligations dictate that college administrators develop an alcohol policy that is consistent with the institution's own culture, mission, and values. The Panel noted that once drafted and adopted, an institution's alcohol policy should be respected and consistently enforced; it should be wholly supported by the college president, students, faculty and staff, and the neighboring community, including law enforcement officers.

Factors that may be external to the campus can also affect college student drinking. For example, alcohol pricing and the density of liquor outlets have been shown to influence consumption by college students. Generally, the lower the price and the higher the concentration of bars and retail outlets near campus, the higher the alcohol consumption by college students.

RECOMMENDATIONS: STRATEGIES TO REDUCE STUDENT ALCOHOL CONSUMPTION

On the basis of the research to date, the Panel identified the following strategies as potentially promising in reducing excessive drinking among college students.

For Colleges and Universities

The Panel recommends that colleges and universities:

- Ensure that research related to their own campus and community is developed and used to gain knowledge about the effectiveness of program interventions and the differential vulnerability of specific populations on campus.
- Consider important methodological issues, including sample representativeness, sample size, the use of well-validated measures, and the integrity of data collection efforts when developing databases for assessment, surveillance, and evaluation.
- Consider the full range and impact of the consequences of heavy drinking, from hangover and missing class to dropping out, damaging property, and alcohol poisoning.
- Recognize that a single approach is unlikely to work for everyone on campus. Because there are multiple reasons for excessive drinking, multiple points of intervention are needed to address them.
- Recognize that there are transition issues related to entering college, especially during the first few months, that make this a critical time for prevention and intervention activities.
- Review policy and its implementation continually and update and/or expand it as needed.
- Involve students in the planning and implementation of interventions; including students often helps ensure the effectiveness of such programs.
- Consider student motivations for drinking when designing interventions and activities to take its place.
- Review the scope of disciplinary sanctions associated with policy violations for appropriateness and for consistency of enforcement.
- Consider carefully a student's history of alcohol-related infractions to determine appropriate action when alcohol-related incidents occur. A prior history of occurrence indicates the need for a different level of attention than a first occurrence. Possibilities include a full clinical evaluation, referral to a substance abuse professional, monitoring, and, for those under 21 years of age, parent contact.
- Recognize that students' limited experiences with both drinking and sexual activity, together with the freedom to experiment inherent in the college environment, place them at elevated risk for combining drinking and sex in hazardous ways.
- Given that at least 50 percent of sexual assaults on campus are alcohol-related, become aware of the scope of sexual assault on campus; determine how "victim friendly" college disciplinary procedures are; and develop opportunities for collaboration between persons responsible for alcohol abuse prevention and those responsible for sexual assault prevention.
- Consider the potential impact on student alcohol use of faculty's and other personnel's consumption at college or university functions.
- Consider carefully the potential mixed messages communicated by accepting sponsorships or gifts from the alcohol industry.

For the Research Community

The Panel recommends that researchers conduct studies to:

- Characterize better the extent of clinical-level problems (alcohol abuse and dependence) and alcohol-related comorbidity in the college population.
- Understand the relationship between clinical levels of drinking and student consumption indicators (e.g., heavy episodic drinking).
- Examine the predictive value of college drinking for later alcohol-related problems.
- Identify the economic consequences of college drinking, including the cost to colleges of damage to the physical plant.
- Assess the impact of community pricing policies on drinking among college students.
- Understand more completely the academic consequences of college drinking, including the mechanism(s) through which alcohol may influence academic outcomes.
- Refine understanding of the heterogeneity of heavy drinking trajectories in adolescence and early adulthood, through longitudinal studies, with a particular focus on what factors determine moving from a heavy drinking or high episodic drinking pattern to a lower one, and vice versa.
- Focus on how developmental transitions to college, to work afterward, to a new intimate partner, or to a new friendship can serve as windows of opportunity for effecting change in behavior, including drinking.
- Examine the relationship between the prior drinking histories of incoming students and their use of alcohol in college and consider what other variables moderate this relationship.
- Assess whether alcohol use by college students interferes with their social and emotional development (both short- and long-term).
- Assess how institutional consequences (e.g., dismissal or other sanctions) affect drinking behavior.
- Identify those problem-related, individual-level variables (e.g., drinking motivations) that are potentially modifiable; use this information to point to opportunities for intervention.
- Discern how individual-level variables interact with the larger environment to identify possible environmental interventions that might reduce the risk of hazardous drinking for especially vulnerable individuals.
- Improve understanding of the association between alcohol consumption and both acute and chronic problems, recognizing the complexities of the relationships, the influence of other variables at the individual and situational levels, and bidirectional causation; high-priority research areas include the effects of alcohol consumption on sexual behavior, sexual assault and other aggression, academic performance, and compliance with academic norms.
- Assess more carefully the validity of self-report measures of student alcohol use and explore the use of alternative data collection methods, including observational, archival, and biomedical methods.

For NIAAA

The Panel recommends that NIAAA:

- Develop, in conjunction with other Federal agencies such as the Center for Substance Abuse Prevention, a set of state-of-the-art measures of alcohol use and alcohol consequences, and guidelines for sampling, data collection, and data analysis appropriate for assessing college student drinking. These measures could be used by colleges to develop databases for (1) monitoring trends, (2) assessing needs, (3) evaluating natural experiments, (4) evaluating planned interventions, and (5) facilitating multicollege comparisons.
- Sponsor technical assistance workshops to provide instruction to college researchers and administrators on the state of the art in research. These workshops should stress the importance of gathering local data from different types of sources, such as college health departments and local police departments.
- Offer technical assistance to colleges on the implementation of policy and interventions.
- Establish national targets for the reduction of college drinking rates, and set timelines for the successful accomplishment of these goals.

The Panel concluded that intervention strategies based on sound, thoughtfully designed research studies are likely to have an effect on reducing excessive and underage alcohol use among college students. The Panel also stressed the need for ongoing evaluation efforts to monitor the interventions adopted and ensure that they continue to be useful and effective for years to come. Although excessive drinking on college campuses may seem like entrenched behavior, the Panel agreed that it is potentially modifiable with carefully targeted approaches endorsed by all stakeholders—including students—who truly value the institution.

HIGH-RISK DRINKING IN COLLEGE: WHAT WE KNOW AND WHAT WE NEED TO LEARN

In the photos they are both smiling—under the birth and death dates that mark two more college students' lives cut short by alcohol.

Jonathan "Jon" Levy was a popular athlete at Radford University in Virginia who was on track to make the dean's list. During his sophomore year, he decided to major in business and join his father's company upon graduation. On October 31, 1997—Halloween night —after consuming alcohol at a party on campus, Jon and two other students decided to drive to a fraternity party in a nearby town. On the way the driver lost control of the car and crashed head-on into oncoming traffic, instantly killing himself, Jon and the driver of the other car (Report of the Attorney General's Task Force on Drinking by College Students, 1998).

Leslie Baltz was a fourth-year honor student at the University of Virginia (U.Va.), majoring in studio art and art history. She had studied early Italian art in Florence for part of her junior year, and had just begun work on her senior honors thesis on early American sculpture. On November 29, 1997, Leslie went to the traditional pre-game parties, where heavy drinking often occurs, before U.Va.'s annual football game against Virginia Tech. Leslie, who usually did not drink heavily, did not feel well after the party and told her friends she was going to stay behind and not go to the stadium for the game. When her friends returned that evening to celebrate after U.Va.'s decisive victory over its rival, Leslie was lying unconscious at the bottom of a flight of stairs. She died the next day from fatal head injuries sustained in the fall (Report of the Attorney General's Task Force on Drinking by College Students, 1998).

*****

THE TASK FORCE ON COLLEGE DRINKING

In response to the major and increasingly visible public health problem of excessive and underage use of alcohol by college students, the National Advisory Council on Alcohol Abuse and Alcoholism, National Institutes of Health, established the Task Force on College Drinking. The Council charged the Task Force with developing a national agenda on college student drinking.

In 1999, the Task Force created two panels: the Panel on Contexts and Consequences and the Panel on Prevention and Treatment. The panels were composed of college presidents, administrators, alcohol researchers, and students (see Exhibit 1 for members of the Panel on Contexts and Consequences). The first panel focused on what is known about alcohol use among college students, and the second focused more specifically on prevention and treatment. The Task Force directed each panel to produce a report that reviewed the scientific literature, identified gaps in knowledge, and recommended promising directions for future research. Each panel commissioned review articles by experts in the field to provide the information base for its report.

Exhibit 1. The Panel on Contexts and Consequences

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Robert A. Zucker, Ph.D.
Professor of Psychology
Director, Division of Substance Abuse,
Department of Psychiatry
Director, Alcohol Research Center
University of Michigan

THE PANEL ON CONTEXTS AND CONSEQUENCES

The Panel on Contexts and Consequences examined the current situation regarding alcohol consumption among college students to define the parameters, magnitude, and characteristics of problem drinking in college. It then summarized and integrated information from varying data sources in an effort to translate research findings more effectively for university administrators, faculty, staff, and students. The Panel's ultimate goal was to develop a report that would help colleges and universities reduce excessive alcohol use on campus. The Panel's deliberations included a special focus on heavy episodic drinking by college students under the legal drinking age of 21 because of the impact of this behavior on students and the institutions they attend.

The purpose of the Panel's report was to:

- Provide a current overview of alcohol consumption among college students;
- Integrate research findings, summarize what is known, and identify gaps in knowledge about college student drinking;
- Suggest factors, problems, and issues that colleges and universities should consider in developing strategies to reduce excessive student drinking; and
- Suggest factors, problems, and issues that researchers and NIAAA should consider in designing and supporting studies to bridge gaps in knowledge.

In a series of meetings held in the Washington, D.C., metropolitan area, members of the Panel on Contexts and Consequences discussed the topics to be included in the commissioned papers; invited authors with the necessary backgrounds and expertise to develop the papers; listened to the authors of the papers present their draft articles; critiqued multiple drafts of the papers in an ongoing peer-review process; and identified areas in need of more research (see Exhibit 2 for a list of commissioned papers). The Panel's sessions were marked by a free sharing of scientific ideas and discussion that gave every Panel member and author an opportunity to present his or her point of view.

Exhibit 2. Papers Commissioned by the Panel on Contexts and Consequences

1. **Studying College Alcohol Use: Widening the Lens, Sharpening the Focus**
   George W. Dowdall, Ph.D., Professor, Department of Sociology, St. Joseph's University, and Henry Wechsler, Ph.D., Lecturer and Director of College Alcohol Studies, Department of Health and Social Behavior, Harvard School of Public Health
2. **Epidemiology of Alcohol and Other Drug Use among American College Students**
   Patrick M. O'Malley, Ph.D., Senior Research Scientist, Institute for Social Research, University of Michigan, and Lloyd D. Johnston, Ph.D., Distinguished Research Scientist, Institute for Social Research, University of Michigan
3. **Student Factors: Understanding Individual Variation in College Drinking**
   John S. Baer, Ph.D., Research Associate Professor, Department of Psychology, University of Washington, and Coordinator of Education, Center of Excellence in Substance Abuse Treatment and Education, VA Puget Sound Health Care System
4. **A Developmental Perspective on Alcohol Use and Heavy Drinking during Adolescence and the Transition to Young Adulthood**
   John E. Schulenberg, Ph.D., Senior Research Scientist, Institute for Social Research, Professor, Department of Psychology, and Research Scientist, Center for Human Growth, University of Michigan, and Jennifer L. Maggs, Ph.D., Associate Professor, Family Studies and Human Development, University of Arizona
5. **The Adolescent Brain and the College Drinker: Biological Basis of Propensity to Use and Misuse Alcohol**
   Linda P. Spear, Ph.D., Distinguished Professor and Chairperson, Department of Psychology, Center for Developmental Psychobiology, Binghamton University
6. **College Factors That Influence Drinking**
   Cheryl A. Presley, Ph.D., Director, Student Health Programs and Assistant to the Vice Chancellor for Student Affairs for Research, Executive Director, Core Institute, Southern Illinois University; Philip W. Meilman, Ph.D., Director, Counseling and Psychological Services, Courtesy Professor of Human Development, Associate Professor of Psychology in Clinical Psychiatry, Cornell University; and Jami S. Leichliter, Ph.D., Behavioral Scientist, Division of STD Prevention, Centers for Disease Control and Prevention
7. **Surveying the Damage: A Review of Research on Consequences of Alcohol Misuse in College Populations**
   H. Wesley Perkins, Ph.D., Professor of Sociology, Department of Anthropology and Sociology, Hobart and William Smith Colleges
8. **Alcohol Use and Risky Sexual Behavior among College Students and Youth: Evaluating the Evidence**
   M. Lynne Cooper, Ph.D., Professor of Psychology, Department of Psychology, University of Missouri at Columbia
9. **Alcohol-Related Sexual Assault: A Common Problem among College Students**
   Antonia Abbey, Ph.D., Associate Professor, Department of Community Medicine, Wayne State University
10. **Alcohol-Related Aggression during the College Years: Theories, Risk Factors and Policy Implications**
    Peter R. Giancola, Ph.D., Assistant Professor of Psychology, University of Kentucky
11. **Today's First-Year Students and Alcohol**
    M. Lee Upcraft, Ph.D., Senior Scientist, Center for the Study of Higher Education, Professor Emeritus of Higher Education, and Assistant Vice-President Emeritus for Student Affairs, The Pennsylvania State University
12. **So What Is an Administrator to Do?**
    Susan Murphy, Ph.D., Vice President, Student and Academic Services, Cornell University

The following sections summarize and synthesize the principal points made in the commissioned papers and during the Panel's discussions. Figures providing a graphic presentation on the scope of the problem can be found in the appendix.

Overview of College Student Drinking

Alcohol misuse on college campuses is not a new problem. It is entrenched in the culture of many institutions of higher learning and in students' social lives. U.S. youth and college administrators alike cite alcohol as the most pervasively misused substance on campus. Recent news stories publicizing alcohol-related deaths on college campuses have drawn attention to this public health problem. Alcohol misuse among college students is taking its toll not only on the students who drink alcohol to excess, but also on other students affected by the behavior of their drinking peers, college administrators, health care personnel who counsel student drinkers, the community, and the institution's physical plant and grounds, which often sustain heavy damage from vandalism by inebriated college students.

Recent concerns have often focused on the practice of binge drinking, typically defined as consuming five or more drinks in a row for men, and four or more drinks in a row for women. A shorthand description of this type of heavy episodic drinking is the "5/4 definition." Approximately two of five college students—more than 40 percent—have engaged in binge drinking in the past 2 weeks, according to this definition. It should be noted, however, that colleges vary widely in their binge drinking rates—from 1 percent to more than 70 percent—and a study on one campus may not apply to others (Wechsler et al., 1994, 1998, 2000b).

The U.S. Surgeon General and the U.S. Department of Health and Human Services (USDHHS) have identified binge drinking among college students as a major public health problem. In *Healthy People 2010,* which sets U.S. public health goals through the year 2010, the Federal government has singled out binge drinking among college students for a specific, targeted reduction (i.e., from 39 to 20 percent) by the year 2010. *Healthy People 2010* notes that: "Binge drinking is a national problem, especially among males and young adults." The report also observes that: "The perception that alcohol use is socially acceptable correlates with the fact that more than 80 percent of American youth consume alcohol before their 21st birthday, whereas the lack of social acceptance of other drugs correlates with comparatively lower rates of use. Similarly, widespread societal expectations that young persons will engage in binge drinking may encourage this highly dangerous form of alcohol consumption" (USDHHS, 2000).

There is evidence that more extreme forms of drinking by college students are escalating. In one study, frequent binge drinkers grew from 20 to 23 percent between 1993 and 1999. The number of students who reported three or more incidents of intoxication in the past month also increased (Wechsler, et al., 2000b). It should be noted, however, that the number of college students who do not drink is also growing. In the same study, the percentage of abstainers increased from 15 to 19 percent.

Binge drinking is not unique to the United States. Although the cross-cultural literature is scant, college students in the United States seem to drink somewhat less than their counterparts in European countries and somewhat more than their counterparts in Asian countries. There is some evidence that problematic drinking-related behaviors such as rowdiness, aggressiveness, and inappropriate actions are more pronounced in the United States than in some other countries (Delk and Meilman, 1996; Hong and Israelowitz, 1989; Leadley and Greenfield, 1999).

Glossary of Alcohol Terminology

There are three broad domains to consider when discussing alcohol involvement: (1) alcohol consumption, (2) alcohol-related consequences or problems, and (3) alcohol dependence. Although conceptually and empirically related, each refers to a distinct set of phenomena and each has important implications for those concerned with college student drinking.

The term **alcohol consumption** refers to the frequency with which alcohol is consumed and/or quantity consumed over a given time. Frequency refers to the number of days or, sometimes, occasions on which someone has consumed alcoholic beverages during a specified interval such as a week, month, or year. Quantity refers to the amount consumed on a given drinking occasion. Most typically, consumption is assessed using "standard drinks." In the United States these are defined as 5 ounces of wine, 12 ounces of beer, or 1.25 ounces of distilled spirits. Quantity and frequency measures can be combined to form a measure of quantity/frequency (Q/F), which estimates the total volume consumed over a specified time. Because individuals do not drink the same amount on each drinking occasion, some surveys attempt to assess the frequency of drinking various amounts of alcohol (e.g., one to two drinks, three to four drinks, five to six drinks, seven or more drinks) over a specified period. This approach, although cumbersome, probably provides a more accurate assessment of total volume consumed as well as variability of drinking pattern.

However, assessing the frequency of drinking varying amounts of alcohol is complex. Moreover, for many purposes, the primary concern is not "light" or "moderate" consumption but rather "heavy consumption." As a result, it is common to assess heavy consumption using the frequency of consuming a number of drinks meeting or exceeding a certain threshold.

Heavy-drinking occasions are often referred to as "binges" in the college student drinking literature. Based on the influential work of Henry Wechsler and colleagues (who define "binge" as five or more drinks in a row for men and four or more drinks in a row for women), the prevalence of binge drinking has become a key metric in estimating the extent of the alcohol problem on college campuses.

There has been some controversy surrounding the use of the term "binge drinking." Historically, binge drinking has referred to an extended period of heavy drinking (for example, a "bender" lasting 3 days or more) that is seen in some alcoholic patients. Some clinicians believe that using the term "binge" to refer to a less severe phenomenon is potentially confusing and blurs this very important distinction. On the other hand, Dr. Wechsler has argued that the term "binge" is used in a variety of contexts (e.g., with respect to eating and shopping) and the new usage with respect to alcohol is consistent with the more general meaning. Other writers have criticized the failure to specify the drinker's body mass and the time period over which five (or four) drinks are consumed, both of which affect blood alcohol concentration (BAC). Dr. Wechsler believes that "in a row" implies a relatively short time, and has argued further that consumption at these levels is associated with a greatly enhanced likelihood of experiencing a range of negative consequences (Wechsler and Nelson, 2001). Whether terms such as "heavy drinking," "binge drinking," or "drinking to intoxication" are used, it is clear that consumption of large quantities of alcohol on a single drinking occasion is an important variable in assessing college students' alcohol involvement.

GLOSSARY OF ALCOHOL TERMINOLOGY (CONTINUED)

Alcohol-related consequences refer to a variety of negative life events that are the direct result of alcohol consumption. These consequences include:

- Social problems (e.g., physical or verbal aggression, marital difficulties, loss of important social relationships),
- Legal problems (e.g., arrests for driving while intoxicated, public inebriation),
- Educational/vocational problems (e.g., academic difficulties, termination from employment, failure to achieve career goals), and
- Medical problems (e.g., physical injury, liver disease, central nervous system disease).

To many, consumption by itself is a major social issue only to the extent that it generates adverse consequences. Consequently, it is possible to conceive of prevention strategies (e.g., designated driver programs) that might not reduce consumption but still reduce consequences.

The term **alcohol dependence** replaces the older term "alcoholism" and refers to a syndrome consisting of signs and symptoms signifying the importance of alcohol consumption in the life of the drinker. Among these signs and symptoms are the following (Edwards, 1986; Edwards and Gross, 1976):

- "A narrowing of the drinking repertoire" (i.e., a tendency for drinking patterns to become fixed, less influenced by environmental cues or contingencies, and motivated by the avoidance of or escape from withdrawal symptoms),
- "Salience of drinking" (i.e., alcohol comes to play an increasingly central role in the life of the drinker relative to other life tasks and challenges),
- Increased tolerance to alcohol,
- Withdrawal symptoms upon cessation or reduction of alcohol intake,
- Drinking to escape from or avoid withdrawal symptoms,
- "Subjective awareness of the compulsion to drink," and
- Rapid reinstatement of dependence symptoms upon resumption of drinking after a period of abstinence.

Both alcohol-related consequences and the alcohol dependence syndrome can be viewed as dimensional constructs that can be graded in intensity from absent to severe. Notably missing from these descriptions is reference to the ***amount*** of alcohol consumed. Although individuals who drink excessive amounts of alcohol are more likely to incur alcohol-related problems and alcohol dependence symptoms, current diagnostic practice focuses more on the consequences of drinking and on the psychological and physiological significance of drinking to the individual than on the quantity or frequency of consumption per se. The fourth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) describes two major categories of alcohol use disorder, (1) **alcohol abuse** and (2) **alcohol dependence**, that roughly correspond to the distinction between alcohol-related disabilities and the alcohol dependence syndrome (American Psychiatric Association [APA], 1994; Edwards and Gross, 1976). Within DSM-IV, alcohol dependence is the more severe disorder, and its presence or history excludes the diagnosis of alcohol abuse.

Barriers to Reducing Alcohol Misuse

Barriers to reducing alcohol misuse on college campuses are numerous. Alcohol use is woven into U.S. culture, is sanctioned by adults for the pleasure of adults, and is associated with times of celebration and happiness. From an early age, many American children see adults drinking at home, in restaurants and clubs, and at parties. They expect to participate in this activity as they grow into adulthood. Although the legal U.S. drinking age is 21 in all States, students know that enforcement of this law is lax in many college environments.

All too frequently, adults sell liquor to underage students without asking for proper identification. Underage students also obtain alcoholic beverages from older students or obtain false identification so they can buy liquor before they reach the age of 21. As one student put it, "[Our] campus culture is most easily identified by the drinking culture. Within weeks of their arrival, freshmen have purchased fake IDs and are frequenting the bars…" (Murphy and Trejos, 2000). Drink specials in bars such as two-for Tuesdays (days on which two beers can be had for the price of one) reinforce drinking as a cultural norm and a way for college students to socialize. "Part of college life is drinking, and you're not going to change that," said another student. "I like the bar scene because it's one way I get to hang out with my friends" (Murphy and Ly, 2000).

Drinking alcohol to excess impairs judgment and self-control. When drinking among college students leads to destructive consequences, including fights, college students themselves are often hard-pressed to explain what happened. "It's a really weird mix of testosterone, alcohol, and some really unseemly behavior," said one young man (Murphy and Trejos, 2000).

While recognizing that students and colleges and universities are increasingly diverse, this report focuses primarily on students who attend 4-year, residential colleges immediately or shortly after high school. The report focuses on this group because of concerns that certain factors related to the "traditional" college experience may inadvertently encourage, permit, or even reward excessive drinking behavior.

Epidemiology of Alcohol Use Among College Students

Although heavy episodic drinking in college is a major public health problem, the majority of college students do not binge drink or drink heavily (Wechsler et al., 2000b). In contrast, students who binge drink three or more times in a 2-week period consume very large quantities of alcohol. The 1997 College Alcohol Study found that this group (20.9 percent of students) consumed a median of 14.5 drinks per week and accounted for 68 percent of all the alcohol consumed by college students (Wechsler et al., 1999).

To form a research-based view of drinking among college students, many researchers working in the field rely on five key national sources of data on youth, each with different characteristics relating to population coverage, data collection methodology, instrumentation, and period of data collection. Findings from these five national data sets are in general agreement that approximately two of five U.S. college students engage in heavy episodic drinking (O'Malley and Johnston, 2002). The five data sets are:

1. The Harvard School of Public Health College Alcohol Study (CAS);
2. The Core Institute (Core), Southern Illinois University;
3. Monitoring the Future (MTF), University of Michigan;
4. The National College Health Risk Behavior Survey (NCHRBS), Youth Risk Behavioral Surveillance, Centers for Disease Control and Prevention (CDC) (unlike the others, this is not ongoing); and

5. The National Household Survey on Drug Abuse (NHSDA), Substance Abuse and Mental Health Services Administration (SAMHSA).

CAS, which is funded by the Robert Wood Johnson Foundation, surveyed more than 15,000 students in 1993; in 1997, there were usable data from more than 14,500 students and in 1999, from more than 14,000 students. Another survey was concluded in 2001. CAS has the following five advantages:

- The sample is randomly selected, allowing its findings to be used to generate national estimates;
- The population samples are large, allowing for the examination of subgroups;
- It provides information about institutions, and respondents are grouped by institution, so institution-level variables and policies can be analyzed;
- The survey focuses on alcohol use and misuse among college students and provides substantial assessments of alcohol use and related attitudes, beliefs, and behaviors; and
- The survey is repeated, so changes in prevalence over time can be studied.

Core is funded by the Drug Prevention in Higher Education Program of the Fund for the Improvement of Postsecondary Education of the U.S. Department of Education. The Core Alcohol and Drug Use Survey is specifically designed for use with college students; institutions participate on a voluntary basis, so the sample is not randomly selected. More than 45,000 students participated in the study's fourth cycle, a period that covered 1992 to 1994. Core's major advantages are:

- The samples are large, allowing subgroups to be examined;
- It provides information about institutions, and respondents are grouped by institution, so institutional variables and policies can be analyzed; and
- It includes questions about the use of alcohol and other drugs, and the survey's "long form" contains questions about other alcohol-related attitudes, beliefs, and behaviors.

MTF is funded by a series of grants from the National Institute on Drug Abuse. Since 1976, the study has conducted annual nationwide surveys of about 17,000 high school seniors, with annual followup surveys of representative subsamples from all previously participating senior classes. These surveys include many respondents who are currently full-time college students.

In this study, students are not clustered by college, and thus there is very limited information about the institution. MTF's major advantages are:

- Relatively long-term trend data are available, beginning in 1980;
- The study is ongoing;
- The design is longitudinal and includes data on students prior to high school graduation so changes in substance use that occur in college can be examined;
- The design includes both college students and same-age peers who do not attend college, so comparisons between the two groups can be made; and
- It provides considerable information about substance use, including tobacco and other drugs, as well as alcohol.

NCHRBS is a one-time study conducted between January and June of 1995 by the Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion,

CDC. More than 4,800 students completed mailed questionnaires, but no information about the institution is available on the public use data files. The major advantages of this sample are:

- Data are available on several health risk behaviors, including alcohol and drug use; and
- The study design allows some ethnic group comparisons.

NHSDA is a series of surveys employing in-home interviews. The study includes more than 4,800 respondents defined as college students and more than 7,000 respondents of college age (17 to 22) defined as not college students. The definition of college student includes both both part-time and full-time students. No institutional data are available. The major advantages of NHSDA are:

- Trend data are potentially available beginning in 1991–1993;
- The study is ongoing;
- The design includes both college students and same-age peers who do not attend college or who have dropped out of high school; and
- A broad range of substance-abusing behaviors is represented.

In addition to the five key sources cited here, there are numerous other potentially valuable data sources. These sources include the University of California at Los Angeles Higher Education Research Institute Freshman and College Student Surveys, the National Longitudinal Survey of Youth, the National Longitudinal Survey of Adolescent Health, the National Archive of Criminal Justice Data, the Substance Abuse and Mental Health Data Archive, The Higher Education Center for the Prevention of Drug and Alcohol Abuse, and the U.S. Census Bureau. Other data are available from smaller surveys and laboratory studies carried out on a single campus or on a few campuses. All add to the knowledge base on drinking among college students.

Drinking Trends Among College Students

Data show a persistently high rate of drinking among young people, including college students, since World War II—a trend that continues to the present. College students generally have higher prevalence rates of alcohol use than their peers who graduate from high school but do not attend college. Although their noncollege same-age peers are somewhat more likely to drink every day, college students are more likely to drink at weekend parties and social gatherings. Data suggest that there are aspects of the college environment that support heavy episodic drinking in ways that are not experienced by noncollege peers. These aspects may include:

- Living in residence halls and Greek houses;
- Substantial amounts of unstructured time;
- More commingling of those who can and cannot purchase alcohol legally than occurs among noncollege peers; and
- Considerable amounts of alcohol advertising directed at the college student population.

Gender differences. Although approximately equal percentages of male and female college students consume alcohol, consumption is generally heavier for males than for females. Core data from 1994 show that about 2½ times as many males (26.4 percent) as females (9.6 percent) consume 10 or more drinks per week. Data from CAS and MTF for 1999, NCHRBS for 1995, and Core for 1994 also show that while

binge drinking approached 50 percent for males, it was between 29 and 40 percent for females (O'Malley and Johnston, 2002).

Ethnic differences. The data from the surveys described above show that rates of binge drinking are highest for White college students. African-American students are lowest on measures of binge drinking, and Hispanic students fall between the two groups. On the basis of MTF data, differences among race/ethnic subgroups seem to have remained constant since 1980. According to CAS, Core, and MTF data, the prevalence of binge drinking among White students is between 40 and 50 percent, among Hispanic students between 30 and 40 percent, and among African-American students between 10 and 20 percent (O'Malley and Johnston, 2002).

Regional differences. Binge drinking rates among college students tend to be highest in the Northeast and North Central regions and lowest in the South and West (Wechsler et al., 1998, 2000). College students in California tend to be somewhat older on average, more likely to be married, and less likely to live on campus, which could contribute to lower binge drinking rates in the West (Wechsler et al., 1997b).

Other drug use. After alcohol, tobacco is the most frequently used substance among college students; about 31 percent of college students have smoked a cigarette in the past 30 days. About 20 percent are current marijuana users, and about 1 percent use cocaine. Data from MTF and NHSDA consistently show that college students drink more alcohol but use less marijuana, cocaine, and cigarettes than their noncollege peers. According to MTF data, about 40 percent of college students binge drink compared to about 33 percent of their noncollege peers, and 31 percent smoke as compared to 40 percent of their noncollege peers. The differences in marijuana use are slight (20 percent compared to 21 percent), but proportionately greater for cocaine (1 percent compared to 3 percent) (O'Malley and Johnston, 2002).

Alcohol abuse and dependence. In a recent study, 31 percent of students met criteria for a diagnosis of alcohol abuse and 6 percent for alcohol dependence in the past 12 months, according to questionnaire-based self-reports about their drinking (Knight et al., 2002). Another recent study estimates that 1.2 percent of 18- to 24-year-old college students and 2.8 percent of noncollege same age peers received alcohol or drug treatment (Hingson et al., 2002).

Drinking Games: Truth and Consequences

In many college environments, drinking is less expensive than most other forms of entertainment. Students say it is cheaper to go to a bar with drink specials than it is to go to a movie. "They have like quarter shot nights and stuff, you know, and it's ridiculous," said one of the student advisors to Panel 1.

Many college students enjoy playing drinking games that encourage excessive alcohol consumption. The games are considered good icebreakers and are sometimes used to reduce social anxiety and get to know people at parties. These games typically involve a set of rules designed to ensure a large consumption of alcohol. Drinking games include board or commercial games such as BEERchesi, BEERgammon, and Beer Softball; coin games such as Psycho, "Quarters," and Beer Battleship; card games; and dice games. These games are now available on the Internet, where Web sites invite users to share their favorites. Researchers who have studied drinking games found that participants in such games report increased levels of drinking and drinking-related problems compared to nonplayers (Engs and Hanson, 1983; Newman et al., 1991; Wood et al., 1992).

Strategies for Filling Gaps in Knowledge: Epidemiology of Alcohol Use Among College Students

The hypothesis that there are aspects of the college environment that tend to support drinking by college students warrants further study. Existing longitudinal data support the interpretation that college environments are

somehow implicated in increasing alcohol use. But the link between college and increasing alcohol use has not been adequately defined. Is it partly that college students tend to drink more when they live on their own, since it is known that students who live on campus drink more than their student peers who still live at home? Additional longitudinal studies will help clarify the association between college environments, individual risk and protective factors, and rates of alcohol use among college students.

Surveying the Damage: Consequences of College Student Alcohol Consumption

College students who use alcohol excessively experience numerous harmful consequences. However, the literature on the epidemiology of those consequences is of mixed quality. It is typically based on self-report methodology and is not as comprehensive or complete as might be wished. Evidence suggests that there is only a modest correlation between college students' self-perception of having a drinking problem and the many negative consequences of drinking that they report (Perkins, 2002).

Damage to Self

Students who engage in risky drinking may experience blackouts (i.e., memory loss during periods of heavy drinking); fatal and nonfatal injuries, including falls, drownings, and automobile crashes; illnesses; missed classes; unprotected sex that could lead to a sexually transmitted disease or an unwanted pregnancy; falling grades and academic failure; an arrest record; accidental death; and death by suicide. In addition, college students who drink to excess may miss opportunities to participate in the social, athletic, and cultural activities that are part of college life.

Academic impairment. Data from several national studies indicate that drinking and academic impairment are associated (Engs et al., 1996; Perkins, 1992; Presley et al., 1996a,b; Wechsler et al., 1994, 1998, 2000b). In addition to students' own perceptions that alcohol use has produced academic impairment, several studies have revealed a consistent association between lower self-reported grade averages and higher levels of alcohol consumption (Engs et al., 1996; Presley et al., 1996a,b). However, it cannot be determined from these studies whether heavier drinking per se is responsible for lower grades. This is because they have generally relied on cross-sectional designs, self-reported grades, and self-reported academic failure due to drinking, and have not taken into account other variables—such as college students' aptitude, high school achievement, and other drug use—that could account for the observed association.

Several studies, however, have specifically accounted for those limitations and have attempted to correct for them in their study designs. One such study of 429 students at a large midwestern university found only a modest role for alcohol involvement in negative educational outcomes (Wood MD et al., 2000). The negative effect of alcohol consumption was most pronounced on educational attainment in college among those students who ranked as high academic performers during their high school years. Another study, a longitudinal investigation of alcohol use by 444 college students recruited as freshmen, found that much of the association between alcohol use and academic problems during college appeared to be due to student differences that predated college admission (Wood PK et al., 1997).

Memory loss. Memory loss during periods of heavy drinking, a common occurrence among alcoholics, is also reported by a significant number of students who drink. In CAS, 10 percent of nonbinge drinkers, 27 percent of occasional binge drinkers, and 54 percent of frequent binge drinkers reported at least one incident in the past year of having forgotten where they were or what they did while drinking (Wechsler et al., 2000b). Other studies have also documented blackouts among college students who drink to excess (Buelow and Koeppel, 1995; Presley et al., 1996a,b; Sarvela et al., 1988).

Injuries, alcohol poisoning, and other fatalities. *Students who misuse alcohol also risk personal* injury and even death. Although it is difficult to unambiguously attribute injuries to drinking in some studies, personal injuries to students as a result of heavy drinking have been documented (Perkins, 1992; Presley et al., 1996a,b; Wechsler et al., 1998, 2000a). The U.S. Department of Education has evidence that at least 84 college students have died since 1996 due to alcohol poisoning or alcohol-related injury. However, it is believed that the total is much greater, since reporting is incomplete. Certainly when alcohol-related traffic crashes are taken into consideration, estimates are much higher. A recent study estimates that more than 1,400 college students between the ages of 18 and 24 die each year from alcohol-related unintentional injuries and 500,000 students between the ages of 18 and 24 sustain unintentional alcohol-related injuries each year (Hingson et al., 2002). Traffic crash data provide additional insight about injuries related to drinking and driving (see Alcohol Use and Driving by College Students, p. 14).

Likewise, few empirical data are available on the association of alcohol use and suicide in the college student population. Although there appears to be an association, the nature of the underlying relationship has yet to be resolved. There is documented evidence that alcohol misuse may potentially lead to thoughts of suicide and suicide attempts among college students (Presley, 1996a, 1996b, 1998), but it is also plausible that suicidal thoughts may lead to increased drinking since, for some, depression increases the tendency to drink heavily.

Many college students who drink heavily experience negative short-term health consequences such as hangovers, nausea, and vomiting. Longer-term health consequences of heavy alcohol use may include reduced resistance to infection (Engs and Aldo-Benson, 1995) and increased vulnerability to lifelong alcohol problems and its attendant physical consequences such as cirrhosis of the liver (Vaillant, 1996). However, heavy drinking in college does not necessarily continue after students graduate. A recent study examining college students' drinking behavior, Greek membership, and postcollege drinking patterns indicates that heavy drinking among members of Greek organizations does not generally lead to increased alcohol use later in life (Sher et al., 2001).

Damage to Others

When college students misuse alcohol, damage to the campus environment or residence hall—including vomit and litter—are common aftereffects. In one national study, 8 percent of all students (11 percent of drinkers) admitted damaging property or pulling a fire alarm in connection with their drinking (Engs and Hanson, 1994). Findings from the CAS and Core studies were similar. Occasional binge drinkers were almost 3 times more likely and frequent binge drinkers nearly 10 times more likely to report having damaged property when compared with students who do not binge drink (Wechsler et al., 2000b). Excessive drinking is also a contributor to fights and interpersonal and sexual violence. It is estimated that each year 600,000 college students aged 18 to 24 are assaulted by another student who has been drinking and 70,000 college students aged 18 to 24 are victims of alcohol-related sexual assault or date rape (Hingson et al., 2002). Sleep loss and interrupted study time on the part of students affected by others' drinking are common. In CAS, 61 percent of nonbingeing students living on campus said they had experienced sleep or study disturbances due to someone else's drinking (Wechsler et al., 1998). In the same study, 50 percent of nonbingeing students living on campus also said that at least once during the past year they had to "babysit" another student who drank too much (Wechsler et al., 1998).

Damage to the Institution

More than 25 percent of college administrators from schools with relatively low drinking levels and more than half of administrators from schools with high drinking levels reported that their campuses have a "moderate" or "major" problem with vandalism and property damage (Wechsler, et al., 1995c). Strains in "town/gown" relations (i.e., between the community and the campus) over student alcohol

consumption may damage the institution's reputation. Similarly, failure and dropout rates due to student alcohol misuse can damage a college's academic image, resulting in the loss of tuition and the capacity to attract high-caliber students. Other factors affecting an institution include the cost of the added time, demands on, and stress experienced by college personnel who must deal with student alcohol misuse. In addition, the costs of legal suits brought against the college for liability in cases of injury, property damage, or death contribute to the toll.

Alcohol Use and Driving by College Students

According to CAS, fully 30 percent of students who drank in the past year said they had driven after drinking alcohol during the past 30 days (Wechsler et al., 2000b). In the Core survey, one-third of students (39 percent of drinkers) admitted driving while under the influence of alcohol or other drugs within the past year (Presley et al., 1996a,b).

About one-half of all fatal traffic crashes among 18- to 24-year-olds involve alcohol, and many of those killed are college students (Chassin and DeLucia, 1996). Further, data from SAMHSA show that an estimated 18 percent of drivers age 16 to 20—about 2.5 million adolescents—drive under the influence of alcohol (Center for Substance Abuse Treatment, 1999).

Recent data from the National Highway Traffic Safety Administration (NHTSA) show that motor vehicle crashes are the leading cause of death for young people, 15 to 20 years of age, and that the severity of traffic crashes increases with alcohol involvement. In 1998, 21 percent of the drivers aged 15 to 20 who were killed in crashes were intoxicated (blood alcohol concentration ≥ 0.10), and 21 percent of drivers in this age group who were involved in fatal crashes (i.e., one in which someone, not necessarily the driver, dies) were intoxicated (NHTSA, 2000). NHTSA does not break down statistics for this age group into college and noncollege students. Nonetheless, many of the young drivers and passengers killed—like Jon Levy from Radford University—were college students.

Alcohol and High-Risk Sexual Behavior

Unintended and unprotected sexual activity is another possible consequence of heavy drinking. In general, studies have shown that college students who drink heavily are more likely to engage in unplanned sexual activity than students who do not drink heavily (Anderson and Mathieu, 1996; Cooper et al., 1994, 1998; Meilman, 1993; Perkins, 1992; Wechsler et al., 1998, 2000b). Data from CAS provide information about the percentage of nonbinge drinkers, occasional binge drinkers, and frequent binge drinkers who engage in unplanned sexual activity or do not use protection when having sex. For unplanned sexual activity, the percentage increases from 8 percent for nonbinge drinkers to 22 percent for occasional binge drinkers to 42 percent for frequent binge drinkers. For unprotected sex, the percentage increases from 4 percent for nonbinge drinkers to 10 percent for occasional binge drinkers and 20 percent for frequent binge drinkers (Wechsler et al., 2000b).

Eight in 10 college students report that they are sexually experienced, 1 in 3 reports having had 5 or more lifetime sexual partners, and 6 in 10 report inconsistent condom use (CDC, 1997; Douglas et al., 1997). As already stated, about four in five drink and two in five binge drink. Given the frequent occurrence of drinking and sexual activity among college students, a substantial proportion would be expected to engage in both behaviors by chance alone. Research indicates, however, that drinking co-occurs with certain risky sexual behaviors at above-chance levels. For example, students who engage in heavy episodic drinking are about twice as likely to have had multiple sexual partners in the past month than nonbinge drinkers (Wechsler, 1995a).

Although research indicates that the relationship between alcohol use and risky sexual behavior is complex, it also suggests that when alcohol is used in the context of a sexual or potential sexual situation such as a date, it is associated with increased sexual risk-taking under some circumstances. Alcohol use appears to be more likely to promote sexual intercourse when the male partner drinks and in situations involving new or occasional sex partners. Drinking prior to intercourse has been consistently related to casual sex as well as to a failure to discuss risk-related topics before having sex (Cooper, 2002).

The disinhibiting effects of consuming alcohol may help explain the relationship between drinking and risky sexual behavior. Alcohol appears to disinhibit behavior primarily as a result of its pharmacologic effects on information processing (Steele and Josephs, 1992). By reducing the scope and efficiency of information processing, alcohol allows simple, salient cues that instigate behavior—such as sexual arousal—to be processed, while blunting the processing of more distal and complex cues, such as the possibility of contracting a sexually transmitted disease, including HIV/AIDS.

Expectancy also plays a role in risky sexual behavior. Preexisting beliefs about alcohol's effects on behavior influence an individual's behavior after drinking (Lang, 1985). Among adolescents and young adults, prior patterns of alcohol use have also been shown to predict the onset of sexual behavior and of risky sexual behavior 6 months to 4 years later. However, existing data do not support inferences of a simple one-way causal influence from drinking to risky sexual activity (Cooper and Orcutt, 2000; Newcomb, 1994). Drinking and sex may covary in part because the opportunity to meet potential new sex partners commonly occurs in settings where people drink, such as bars. It is likely that multiple causal processes operate together to create the patterns of association observed between alcohol use and risky sex.

Alcohol and Physical and Sexual Aggression

Research shows that alcohol consumption is associated with aggressive behavior (Chermack and Giancola, 1997; Roizen, 1993). Although there is little research on this issue as it affects college students specifically, studies show that a substantial proportion of young adults engage in fighting while intoxicated (Wechsler et al., 1995c). Alcohol-related aggression is a serious problem on college campuses, but it is not clear whether alcohol promotes aggressive behavior in some people or whether individuals who are more aggressive tend to drink more (Giancola, 2002).

Because not all people become aggressive when they drink, it can be argued that alcohol does not cause aggression directly through its pharmacological effects alone (Bushman and Cooper, 1990). Rather, intoxicated aggression appears to be the product of individual differences and contextual variables interacting with pharmacodynamics (Chermack and Giancola, 1997). Evidence from both animal and human research indicates that there is a positive relationship between levels of the male hormone testosterone and physical aggression (Volavka, 1995). A recent study found that healthy male college students with high levels of testosterone, measured in saliva, were more aggressive on the Taylor Aggression Paradigm—a behavioral measure of aggression—than those with low levels (Berman et al., 1993). Heightened aggression has also been associated with low levels of the brain neurotransmitter serotonin (Berman et al., 1997). It may be that the aggression-enhancing effects of alcohol are more likely to occur in people with higher baseline levels of testosterone and lower levels of serotonin.

Incidence on campus. Alcohol-related sexual assault is a common occurrence on college campuses. Although estimates of the incidence and prevalence vary dramatically because different sources use different definitions and many victims are unwilling to report sexual assaults to the police or other authorities, at least 50 percent of college student sexual assaults are associated with alcohol use (Abbey, 1991, 2002; Abbey et al., 1996, 1998; Copenhaver and Grauerholz, 1991; Harrington and Leitenberg, 1994; Koss, 1992; Koss et al., 1987; Miller and Marshall, 1987; Muehlenhard and Linton, 1987; Presley

et al., 1997; Tyler et al., 1998). Further, when alcohol is involved, acts meeting the legal definition of rape appear more likely to occur (Ullman et al., 1999).

Typically, if either the victim or the perpetrator is drinking alcohol, then both are (Abbey et al., 1998). In one study, both the victim and the perpetrator had been drinking in 97 percent of sexual assaults involving alcohol (Harrington and Leitenberg, 1994). In another study the rate was 81 percent (Abbey et al., 1998). Because rates of alcohol consumption are higher among White college students than among their African-American peers, it is not surprising that alcohol-related sexual assaults appear to be more common among White college students than among African-American college students (Abbey et al., 1996; Harrington and Leitenberg, 1994). Rates of alcohol-related sexual assault have not been examined in other ethnic groups.

Targets of sexual assault. Sexual assaults most frequently occur among individuals who know each other, in the context of a date or party at the woman's or man's home (e.g., residence hall, apartment, fraternity, sorority, and parents' homes). In a sample of 416 college women who had experienced sexual assault, those involving alcohol were more likely to be perpetrated by a nonromantic friend or acquaintance. Sexual assaults that did not involve alcohol were more likely to be committed by a romantic partner (Norris et al., 1998). No one profile fits men who have committed sexual assault and no specific personality traits have been linked to female victimization. However, college women who experience sexual assault are more likely than their nonassaulted female peers to have been sexually assaulted in childhood, to be heavy drinkers, and to have frequent sexual relationships (Abbey et al., 1996; Gidycz et al., 1993; Greene and Navarro, 1998; Himelein, 1995).

People who were sexually abused as children experience "guilt, shame, anger and loss of self-esteem ... [and] may express their inner turmoil through ... alcohol and other drug use and indiscriminate sexual behavior" (Wilsnack, 1984). Heavy drinking and frequent dating, in turn, put women at greater risk of sexual assault because men view them as easy targets and because they are less able to resist advances when intoxicated (Bowker, 1979; Harrington and Leitenberg, 1994; Wilsnack et al., 1997). Female college students report that sometimes it is easier to give in than to fight a sexually coercive male (Murnen et al., 1989). The fact that alcohol consumption and sexual assault frequently co-occur does not mean that alcohol *causes* sexual assault. However, it is likely that alcohol plays an important but complex role (Abbey, 2002).

Differences in Consequences Among Population Subgroups

Certain negative consequences associated with heavy drinking such as property damage and aggression are more common among men than among women. This pattern is not surprising because male college students consume more alcohol, on average, than female students (Berkowitz and Perkins, 1987).

Women. Although women may not drink as much, on average, as men, women who drink heavily may actually experience more serious consequences due to higher levels of intoxication. CAS found that women who drank four drinks in a row were about as likely to experience negative consequences from their drinking as men who drank five drinks in a row (Wechsler et al., 1995b). Some researchers have argued that gender differences in overall negative consequences from heavy drinking have been overestimated. In their view, research has not adequately accounted for the types of consequences that commonly affect female students who drink (Perkins, 1992). Although males are more likely to damage property and physically injure others while drinking heavily, gender differences decline or all but disappear when academic performance, unintended sexual activity, blackouts, and injury to self are considered (Lo, 1996; Wechsler and Isaac, 1992).

Race/Ethnicity. In terms of racial and ethnic differences, it appears that rates of drinking consequences closely follow the racial/ethnic patterns reported for consumption levels (Presley et al., 1996a,b). That is, White students have the most problems as a result of heavy drinking, followed by Hispanics. African-Americans and Asians have the lowest levels of reported problems.

Strategies for Filling Gaps in Knowledge: Consequences of Student Alcohol Consumption

Although many studies on the negative consequences of student drinking have been published, a systematic assessment of the damage is far from complete. There is a need for:

- More longitudinal studies that track drinking histories and subsequent collegiate performance;
- Research on the cost of lost educational opportunities and impaired athletic performance due to drinking;
- Information on the clustering of adverse consequences by type of damage or among student subgroups; and
- Studies exploring what consequences students perceive and experience as negative to help researchers understand why students misuse alcohol.

In addition, studies are needed on such consequences as the extra demands created by student alcohol misuse for student health and counseling services, college security and enforcement, custodial services, and legal counsel. Public relations costs for administrative damage control directed toward parents, the community, the media, and alumni should also be included.

Carefully designed studies in settings where drinking and risky sex may co-occur could offer new insights into whether, and how, alcohol affects sexual risk-taking and suggest possible strategies for risk reduction. Diary methodology could also be helpful in elucidating the relationship between drinking and risky sex.

There is no single profile that will predict intoxicated aggression in all persons; studying variables that affect alcohol-related aggression (such as temperament, regulation of emotions, and hostility) might help elucidate the mechanisms that underlie the alcohol-aggression relationship.

Additional studies are needed to collect information about the prevalence of sexual assault at given institutions and to review disciplinary procedures to ensure that they are "victim friendly" rather than "victim punitive." Conducting sexual assault needs assessment surveys and focus groups with students can provide useful information that will help administrators tailor risk reduction and prevention programs to the needs of students at their institutions.

Understanding College Drinking From a Multidimensional Perspective

Research consistently shows that no single factor determines whether a college student will misuse alcohol. Multiple developmental, individual, and environmental factors influence this outcome, both individually and interactively. These factors include public policy; social and institutional structures such as law enforcement; market mechanisms; legal availability of alcohol; economic availability, including retail price and disposable student income; social integration into college life; family roles and influence

of family background and peers; family history of alcoholism; student belief system and personality; expectancies regarding alcohol's effects; and the social context in which drinking takes place.

Developmental Factors

The problems of college drinking are, in part, a product of development. The college years are a time of transition that involve multiple adjustments including a reexamination of identity, exploration of new social relationships, and changes in living situations. However, this time is also one of potential transition for those who do not attend college. To the extent that high-risk drinking and drinking problems can be identified among college students and same-age nonstudents, it is possible that behavior usually associated with "the college years" is actually characteristic of "the years of late adolescence and early adulthood" more generally. For both college and noncollege youth, this period of life involves greater personal freedom and independence, increased involvement in intimate relationships, and freedom from the responsibilities that marriage, family life, and the workplace typically entail.

When considered in a developmental framework, college students face multiple, challenging transitions (Schulenberg and Maggs, 2002), including:

Pubertal and physical development. Hormonal changes, physical development, and societal expectations lead to increased interest in sexual relationships and in use of alcohol. Adolescents begin to look like adults, and they may desire adult status and privileges such as the right to drink.

Brain development. During adolescence, a major "remodeling" of the brain occurs in most species. This remodeling includes not only the formation of new synaptic connections in certain neural systems, but also the pruning of synaptic connections in specific neural systems. Research findings about the behavioral and developmental characteristics of human adolescents are supported by findings from animal studies (Spear, 2002). For example, reminiscent of human adolescent behavior, adolescent rats are often hyperactive and explore more vigorously relative to rats of other ages (Spear et al., 1980). In addition, both human adolescents and adolescent laboratory rats show an enhanced hormonal and physiological response to stressors (Bailey and Kitchen, 1987; Meaney et al., 1985; Ramaley and Olson, 1974; Rivier, 1989; Walker et al., 1986, 1998). What makes these similarities interesting in the present context is other research that suggests that exploratory behavior and stress may be important factors involved in the tendency of human adolescents to drink heavily (Baer et al., 1987; Deykin et al., 1987; Pohorecky, 1991; Tschann et al., 1994; Wills, 1986). These and other related findings are provocative; however, additional study is needed to determine whether and how biological brain remodeling and adolescent behavioral and developmental characteristics are associated with alcohol initiation, use, and misuse. Further research is also needed to establish whether adolescence represents a period of particular vulnerability to alcohol neurotoxicity (Brown et al., 2000; DeBellis et al., 2000; Tapert and Brown, 1999).

Cognitive and moral development. Normative cognitive changes in this period include the increased ability to think abstractly, view issues as relative rather than absolute, and make judgments based on higher-level, universal principles such as justice and equality, rather than "arbitrary" rules. Due in part to these cognitive developments, some college students view adult-imposed prohibitions against youthful alcohol use skeptically. They know that adults use alcohol and may consider age-based restrictions unfair and discriminatory.

For many older adolescents and young adults, the decision to drink is a rational one. For others, norms supporting excessive consumption, combined with inexperience, often lead to risky drinking behavior.

Identity domain transitions. College is a time when students, through the exploration of philosophies, lifestyles, relationships, and behaviors, eventually make commitments to an integrated set of personal beliefs, values, and goals. Such exploration of identity is normal and healthy but may increase experimentation with risky behaviors, including alcohol consumption.

Transformations in relationships with the family of origin. College students experience increasing autonomy and independence from their parents. Ideally, increasing independence should occur in the context of continued family support and attachment. Indeed, the quality of a college student's relationship with his or her parents may actually improve when the adolescent moves out, even though the quantity of parental interactions decreases, thus reducing day-to-day parental influence. Having older siblings may increase the college student's alcohol expectancies and consumption pattern, especially if he or she looks up to an older sibling who drinks.

Transformations in relationships with peers. Older adolescents spend more time with their peers, and many are susceptible to peers' suggestions that they engage in risky behaviors, including excessive drinking. Cultural myths about campus drinking may increase use and misuse of alcohol, especially when alcohol use is considered a fundamental part of social relationships and socializing.

A developmental perspective encourages the examination of alcohol use and heavy drinking in relation to normative developmental tasks and transitions in college students' lives. Because conceptual models can be useful in relating developmental transitions to health risks, including risks from alcohol misuse, five that have been usefully applied to the problem of college student drinking are included here (Schulenberg and Maggs, 2002).

1. The **overload model** postulates that multiple developmental transitions may overwhelm the individual's coping capacities, resulting in increased health-risk behaviors such as heavy drinking.

2. The **developmental mismatch model** posits that developmental transitions may decrease the match between individuals' needs or desires and opportunities in the new contexts in which they find themselves, resulting in an increase in health-risk behaviors (e.g., as a form of compensatory behavior or self-medication).

3. The **increased heterogeneity model** states that developmental transitions may exacerbate individual differences in ongoing health-risk trajectories. Thus, a college student who already has an emotional or psychological problem may have difficulty negotiating the challenge of a new transition and may turn to heavy drinking as a form of self-medication.

4. The **transition catalyst model** states that health-risk behaviors may help in or be fundamental parts of negotiating certain developmental transitions. Thus, a college student may drink heavily in the belief that drinking may lead to new friendships, romantic and/or sexual relationships, and social bonding.

5. The **heightened vulnerability to chance events model** postulates that individuals undergoing developmental transitions may seek out novel experiences, thereby increasing their vulnerability to both the positive and negative effects of chance events. For example, a student who typically does not drink to excess may participate in heavy episodic drinking as a rite of passage in college, placing himself or herself in a position of heightened vulnerability to alcohol's damaging effects.

Models such as these can often enhance our understanding of developmental phenomena and provide guidance for theoretically based research.

The particular challenge of the college student's first year. The first year in college represents a social and developmental milestone for all college students, whatever their background or type of institution. This transition is often so difficult to negotiate that about one-third of first-year students fail to enroll for their second year of college (Upcraft, 2000). There is some anecdotal, although not much empirical, evidence that the first 6 weeks of enrollment are critical to first-year student success. Due to the changing demographics among students attending college, first-year experiences may be variable (see box below).

Many college students today are not as academically prepared for college as they should be, as reflected in the finding that about 29 percent of today's first-year college students are enrolled in remedial reading, writing, or mathematics courses (King, 1998). Many first-year college students are also under financial pressure; only about 20 percent of undergraduates between the ages of 18 and 22 are pursuing an exclusively parent- or student-financed education (*National On-Campus Report,* 1992).

First-year college students also appear to be more academically "disengaged" than those in years past, according to 1999 freshman norms based on the responses of 261,217 students at 462 U.S. 2- and 4-year colleges and universities (Sax et al., 1999). In 1999, fully 40 percent of first-year students reported feeling frequently "bored in class"—a record number. In 1985, that percentage was 26 percent. Along with reporting boredom in class, a record high of 63 percent of college freshmen came late to class frequently or occasionally in 1999 compared to 49 percent in 1966. The percentage of first-year students who overslept and missed a class or appointment rose to 36 percent in 1999 from 19 percent in 1968.

In addition to academic disengagement, a record number of entering college students—30 percent—reported feeling frequently "overwhelmed by all I have to do" in 1999 compared to a low of 16 percent in 1985 (Sax et al., 1999). Although occasional feelings of anxiety have long characterized the majority of entering college students and are considered a normal part of this developmental transition, the percentage of students who report feeling "frequently" overwhelmed has grown steadily over the past

Whatever Happened to Joe College?

As mentioned earlier, this report focuses on traditional-age students attending college immediately or shortly after high school. However, when examining the problems of alcohol misuse on college campuses, it is important to remember that today there is no typical college student—no prototype "Joe College." Changing demographics and enrollment patterns have resulted in a more diverse population of college students who face differing first-year experiences and challenges. Until about 1980, more men than women attended college, but since then, women have outnumbered men among first-time enrollees. According to the *Chronicle of Higher Education Almanac,* in 1997, 55 percent of students in postsecondary education were women (*Chronicle of Higher Education Almanac,* 1998). In addition, the enrollment of racial and ethnic minority students has grown dramatically, accounting for about 29 percent of today's college students (*Chronicle of Higher Education Almanac,* 1999).

More students are also opting to go to college part-time. In 1995, 35 percent of all undergraduate students were enrolled part-time compared with 29 percent in 1976 (*Chronicle of Higher Education Almanac,* 1998). Furthermore, today the largest single category of college student attends a 2-year institution, while only a short time ago the largest category attended 4-year institutions (Carnegie Foundation, 1994). In addition, more college students are choosing to live off campus; today only about 13 percent of students live on campus (Upcraft, 1994). Students are also taking longer to graduate. According to a survey by the National Collegiate Athletic Association, only 56 percent of full-time, first-year students graduate within 6 years.

Overall, the contemporary picture of those attending college features a student body that includes all races and ethnicities, mixed nationalities, more women than men, the able and disabled, and students of differing sexual orientations and ages. Most students live off campus, with more than one-third attending school on a part-time basis.

15 years, with 39 percent of women and 19 percent of men reporting this level of stress in 1999. A possible factor contributing to the growing stress among incoming college students is the record proportion who report "some" or a "very good likelihood" of working full-time while attending college—25 percent in 1999 compared to 16 percent in 1982 (Sax et al., 1999).

Trajectories of binge drinking. Distinct trajectories of binge drinking during the transition to young adulthood (ages 18 to 24) have been documented by Schulenberg and colleagues (1996) in a four-wave study. These researchers identified six trajectories of binge drinking that applied to all but 10 percent of the sample:

1. Chronic (two or more binge drinking episodes in the last 2 weeks across all four waves);
2. Decreased (started like the chronic group in high school, and then decreased binge drinking across the four waves);
3. Increased (very little binge drinking in high school, and increased binge drinking across the four waves, catching up to the chronic group);
4. Fling (very little binge drinking in high school, followed by a rapid increase and then a decrease across the four waves);
5. Rare (very little binge drinking across the four waves); and
6. Never (no binge drinking across the four waves).

Trajectories vary according to gender, ethnicity, and college student status in ways consistent with findings already described in this report. For example, compared to men, women are underrepresented in the chronic and increased groups and overrepresented in the never group. Compared to most ethnic minorities, Whites are overrepresented in all groups except the never group.

When considering the problem of heavy drinking during adolescence, and especially during the transition to young adulthood, it is essential to examine different trajectories over time. A key reason to be concerned with differential change in alcohol use over time is that a given level of use at any given time could result from a number of different trajectories, with some being far more troublesome than others.

The challenges faced by colleges and universities encompass more than the behavioral issues linked to transition. In many cases, they must also respond to a subset of alcohol problems that began during high school or earlier. Although the college experience does not "cause" these drinking problems per se, they are frequently identified in college and thereby become a "college problem."

Individual Student Factors

No one individual profile describes college students who drink. Many factors specific to the individual influence how a particular college student views and uses alcohol. Differences in personality, social relationships, beliefs, attitudes, psychological needs, and responses to alcohol have all been studied to explain why some people use alcohol more than others. The challenge for researchers is to integrate these variables and develop multivariate models that can explain the relationship between patterns of drinking and combinations of risk factors and outcomes (Baer, 2002).

Genetic vulnerability and family factors. Alcohol problems run in families, with the best available research indicating that both genetic and environmental components contribute to risk (McGue, 1999). Although extensive genetic research is under way, the mechanisms of genetic and family risk remain unclear. Approximately 10 percent of college students report growing up in a home where a parent abused

alcohol. These children of problem drinking parents exhibit a bimodal pattern of drinking behavior, with higher than normal odds of past-year abstinence or binge drinking (Weitzman and Wechsler, 2000). Although there is little evidence that children of alcoholics metabolize alcohol differently than others, they may be more sensitive to the early, stimulating, and stress-dampening effects of alcohol and less sensitive to the delayed, subjectively assessed depressant and motor effects of alcohol (Newlin and Thomson, 1990; Schuckit, 1998; Sher, 1991; Wood MD et al., 2001).

Personality. Decades of research have failed to identify an "addictive personality." However, certain personality traits have been related to drinking habits. For example, sensation-seeking has been related to higher rates of consumption, while religiosity has been related to lower rates. Personality traits are typically seen as mediating or moderating the relationship between biological, psychological, social, and environmental factors and subsequent alcohol use and misuse.

There is strong and consistent research evidence linking problem drinking with impulsivity and disinhibition, moderate evidence of links with neuroticism and emotionality, and mixed evidence for a link with sociability and being extraverted (Sher et al., 1999). Consistent with this research is the finding that two problem drinking patterns appear to be dominant among college students. These are (1) a pattern of heavier drinking related to impulsivity and sensation-seeking and (2) a pattern of heavier drinking associated with negative emotional states.

Beliefs about alcohol. Learning about alcohol can occur at very young ages, before alcohol is consumed, as children observe others drinking (often their parents). There is good evidence that beliefs about alcohol are related to the initiation of drinking behavior. It is common for a college student to begin drinking based on what he or she has observed adults doing to cope with stress, enliven a party, or relieve boredom. Although most of this belief structure is in place before college, the college environment presents a stimulus structure that can reinforce prior beliefs—for example, that drinking is fun and makes people sexier.

Students vary considerably in their perceptions and expectations of whether alcohol is a positive or negative influence on behavior. Their reasons for drinking also vary and have been linked to the management of specific emotional states, such as feeling unhappy, with drinking seen as a form of self-medication for these feelings. For some, a belief becomes a linkage to alcohol use. For example, if a student believes that alcohol will make him or her more sociable, he or she may drink for that reason. A person who drinks to manage negative emotional states might use alcohol to cope with stress, relieve depression or social anxiety, or boost low self-esteem. It should be noted, however, that in the absence of beliefs that alcohol produces certain psychological states—stress reduction and/or mood elevation—the relationship between stress and depression and alcohol use is not found (Cooper et al., 1995; Kushner et al., 1994).

Religiosity. Several large, multicampus studies show that students who are more religious and more committed to traditional values drink less than their peers who are less religious (Engs et al., 1996; Wechsler et al., 1995a).

The influence of prior drinking, peers, and family. For some students, alcohol use in high school has already set the stage for college drinking, with an enabling environment on campus supporting precollege drinking behavior. A study of 140 college campuses found that the frequency of binge drinking in high school predicted the frequency of binge drinking in college (Wechsler et al., 1995a).

Peer use is one of the strongest correlates of adolescent alcohol use (Bucholz, 1990; Jacob and Leonard, 1994). Young people tend to select peers who drink like they do and to influence each other to drink (Curran et al., 1997; Kandel, 1986).

A number of parenting practices including parental conflict, insufficient monitoring of adolescent behavior (e.g., not knowing where children are at night), and poor communication have also been associated with adolescent drinking problems (Barnes, 1990; Jacob and Leonard, 1994).

Environmental Factors

Although the existing literature on the influence of collegiate environmental factors on student drinking is limited, a number of environmental influences working in concert with other factors may affect students' alcohol consumption (Presley et al., 2002). Students are not passive members of the college community; campus culture interacts with personality and experiential variables to influence the use and misuse of alcohol. Some potentially influential environmental factors are listed below.

The social scene. The college years are marked by social activity with much student drinking occurring at small and large parties. Indeed, the social environment on campus and social processes appear to play a critical role in influencing drinking in college (Baer, 1993; Maggs, 1997).

College organizational aspects. Several aspects of a college's organization are associated with student drinking. Among them are the following:

- **Historically black colleges and women's colleges.** Historically Black colleges and universities and women's colleges tend to have lower rates of excessive drinking compared to predominantly White and coeducational institutions (Dowdall et al., 1998; Meilman et al., 1994, 1995). More research is needed to determine whether attendance at a historically Black or women's college mitigates against excessive alcohol use.
- **Presence of a Greek system on campus.** The presence of a Greek system on campus increases the likelihood of heavy alcohol use. Similarly, participation by individual students in fraternities or sororities tends to increase the likelihood that they will drink heavily. Living in a Greek house, belonging to a Greek organization, and intent to join the Greek system are all correlated with higher rates of binge drinking, frequency of drinking, and negative consequences associated with drinking (Klein, 1989; Lo and Globetti, 1993; Wechsler et al., 1996; Werner and Greene, 1992). Among members of fraternities and sororities, the rate of binge drinking (according to the 5/4 definition) is 65 percent; among those living in fraternity and sorority houses, the rate is 79 percent (Wechsler et al., 2000b). What is not known, however, is whether and to what extent fraternities and sororities attract those who are more inclined to drink excessively and whether and to what extent such behavior is a result of participation in the Greek system (Borsari and Carey, 1999). Probably both scenarios are occurring to some extent. One study, for example, found that a much higher percentage of male students who were binge drinkers in high school became members of fraternities in college and that among women who did not binge in high school, those who joined a sorority were much more likely to start bingeing in college than those who did not join a sorority (Wechsler et al., 1996). It should also be noted that while the presence of a Greek system is associated with higher rates of binge drinking on campus, there are colleges that have no Greek system and a high percentage of binge drinkers.
- **Importance of athletics on campus.** Multi-institutional research has found that the importance of athletics on campus and student involvement in athletics are positively associated with higher rates of excessive drinking (Leichliter et al., 1998; Nelson and Wechsler, 2001; Wechsler et al., 1997a). A March 1999 symposium sponsored by The Higher Education Center for Alcohol and Other Drug Prevention focused on the fact that college athletes are more prone to the adverse consequences of alcohol than are nonathletes. Research has also shown that athletes who are members of the Greek system are at even greater risk for heavy drinking (Meilman et al., 1999). However, no study to date has looked at this issue with respect to campuses that are both Greek and focused on athletics to

discern how these two factors, when linked, relate to overall campus alcohol consumption and campus culture.

- **Two-year versus 4-year institutions.** Data from 2- and 4-year colleges and universities show that students at 2-year institutions reported lower average weekly consumption of alcohol and lower rates of binge drinking than students at 4-year schools (Presley et al., 1993, 1995, 1996a, 1996b).
- **Substance-free residence halls and campuses.** Research indicates that living in a substance-free residence hall has a protective effect and is associated with a lower likelihood of binge drinking in college for students who did not binge in high school (Wechsler et al., 2001b). In addition, students living in substance-free dorms experienced fewer secondhand effects than students living in unrestricted housing. Another study found that college students on campuses that ban alcohol were 30 percent less likely to binge drink and were more likely to abstain from alcohol (Wechsler et al., 2001a). Furthermore, fewer students on campuses that ban alcohol experience secondhand effects from others' drinking than those on campuses that do not ban alcohol.

Physical properties of college campuses. Several physical properties of college campuses are associated with college student drinking, including the following:

- **Commuter versus noncommuter schools.** If a college is primarily a commuter institution, alcohol consumption among its students tends to be lower. Commuters living at home are more likely to be lighter drinkers than students who live on campus (O'Hare, 1990; Wechsler et al., 1994, 1998, 2000b). The Core survey found differences in drinking levels between students who lived in on-campus versus off-campus housing (Presley et al., 1996a). The average number of drinks per week and the number of binge-drinking episodes were higher for on-campus as compared to off-campus residents. On-campus residents who drank the most lived in a fraternity or sorority house (Presley et al., 1993; Wechsler et al., 2000b). Students living at home appear to be more likely to drink in night clubs and bars, whereas residence hall students are more likely to drink in large, mixed-gender groups in their own residences. These findings are not surprising. Although parents and peers are both influential in defining standards of drinking, peers appear to be more influential in terms of affecting actual drinking behavior (Fromme and Ruella, 1994).
- **School size.** Students at smaller schools consume greater amounts of alcohol on an average weekly basis than students at larger schools (Presley et al., 1993, 1995, 1996a, 1996b). This may be partially explained by the fact that larger schools are likely to have more commuter students who tend to drink less (see above). Because school characteristics such as size are correlated so closely with other institutional characteristics, such as public versus private sponsorship, religious affiliation, and location (rural, small town, suburban, urban), it is difficult to disentangle the influences of these characteristics.
- **Location.** Alcohol consumption rates in colleges vary by region. It has been consistently shown that students at schools in the Northeast section of the United States, followed by those in the North Central region, consume more alcohol and have higher binge drinking rates than students at colleges in other sections of the country (Presley et al., 1993, 1995, 1996a, 1996b; Wechsler et al., 1994, 1998, 2000b). These regions also have the highest rates of occasional heavy use and annual and 30-day use among young adults generally (Johnston et al., 2001a, 2001b). There is also anecdotal evidence that students on rural campuses drink more than students on urban or suburban campuses. The CAS data show that binge rates of rural/small town campuses are consistently higher than those of urban/suburban campuses (for example, 49 percent versus 42 percent in 1999), although the differences are not statistically significant.

Alcohol pricing. Researchers agree that higher alcoholic beverage prices and higher taxes result in less drinking; however, the magnitude of consumer response is more difficult to specify. Using econometric estimates in a policy simulation analysis, one study found that increases in alcoholic beverage prices would lead to substantial reductions both in the frequency of alcohol consumption by youth and in heavy drinking among youth (Chaloupka, 1993). The study also concluded that the effects of excise tax hikes on alcohol exceeded the effects of establishing the uniform legal drinking age of 21 in all States studied. When the research was expanded to include not only the monetary price of alcoholic beverages, but also the other "costs" of heavy drinking, including time spent obtaining alcohol and legal costs associated with drinking-related behavior, it found that drinking by youth is price-sensitive (Chaloupka et al., 1998). Increases in total cost can significantly reduce consumption (Chaloupka et al., 1998). Data from the CAS indicate that price significantly affected underage drinking and binge drinking by female students but not by male students (Chaloupka and Wechsler, 1996). Another analysis of CAS data found that underage, as compared to legal age, college students were more likely to obtain alcohol very cheaply and that paying a low price per drink or a set fee for "all you can drink" is associated with heavy episodic drinking (Wechsler et al., 2000a).

Outlet density and drinking venues. Research has shown that (Gruenewald, 1999):

- Population growth leads to a greater number of alcohol retail outlets;
- Greater numbers of alcohol retail outlets translate to greater alcohol use; and
- Greater use of alcohol results in more alcohol-related problems.

One study found that when alcohol outlet concentrations increase and multiple drinking venues exist, both long-term and short-term drinking problems increase (Gruenewald, 1999). Another study indicated that level of drinking, drinking participation, and binge drinking are all significantly higher among college students when there are a greater number of outlets licensed to sell alcohol near campus (Chaloupka and Wechsler, 1996). A third study found that parties, dates, and socializing, along with being with friends, are the most common situations where heavy student drinking occurs, suggesting that a reduction in alcohol outlets might affect student drinking levels in social situations (Clapp et al., 2000). Although this was a single-institution study, it was well designed and explored some of the environmental variables that may put college students at risk for alcohol misuse.

There is no doubt that social availability affects drinking on campus. Social availability is defined in this context as actual, easy access to alcohol, such as at beer-keg parties where heavy drinking is the norm; participating in drinking games (see box on page 11); and attendance at gatherings where older students obtain alcohol for younger students.

A study that followed 319 young adults throughout 4 years of college and for 1 to 3 years afterward found that during the college years members of Greek societies consistently drank more heavily than their non-Greek peers (Sher et al., 2001). Statistically controlling for previous alcohol use did not eliminate the higher consumption level among Greeks. However, Greek status did not predict heavy drinking levels postcollege. Study results suggest that perceived social norms associated with drinking in the Greek system are largely responsible for the prevalence of heavy drinking among fraternity and sorority members. In short, heavy drinking among Greeks is the norm and Greeks perceive their peers as supportive of a heavy-drinking lifestyle. However, once out of a Greek environment in which heavy drinking is normative and encouraged, these young adults' drinking patterns are similar to those of their non-Greek peers (Sher et al., 2001).

Strategies for Filling Gaps in Knowledge: Understanding Drinking in College From a Multidimensional Perspective

Research on drinking among college students must take into account the multiple developmental, individual, and environmental factors (and their interactions) that appear to affect whether and how much college students drink.

The research literature in this field is large but of uneven quality. To improve this situation and build on some of the excellent work in this area, future research efforts should test interactive and mediating models of multiple risk factors based on theory, address developmental processes, and use additive models of multiple risks to identify those students at highest risk for alcohol-related problems.

Developmental processes. Developmental transitions represent windows of opportunity for effecting change and the college student is dealing with a number of such transitions. More studies are needed on the value of intervening at critical transitional periods with developmentally appropriate prevention strategies to reduce excessive drinking. Intervention strategies should be implemented not only on an individual level, but also on a contextual level aimed at changing group social norms. Students themselves should be partners in this process.

There is also a need for more research on the unique characteristics of the adolescent brain and on ways in which these neurological features may predispose adolescents to behave in particular ways, including the initiation of drinking behavior. Studies are also needed to explore whether adolescents may show reduced sensitivity to alcohol intoxication, leading in some cases to higher alcohol intake to attain reinforcing effects. Finally, the possibility that adolescents are particularly vulnerable to the long-term effects of alcohol on cognitive development needs to be investigated more thoroughly.

The college context. Since contextual factors are correlated with drinking by young people, studies are needed to:

- Examine alcohol retail outlet density and alcohol pricing with respect to the specific college context;
- Investigate whether students "self-select" for high-binge institutions, and how students arrive at their perceptions of a college's or university's high drinking rate;
- Assess the relationship of high-risk drinking in college to the surrounding communities' tolerance for drinking; students' perceptions of drinking at their college relative to their perceptions of drinking at other colleges; and students' individual beliefs about alcohol and about their own drinking patterns; and
- Elucidate how cultural factors on campus influence high-risk drinking, including protective factors such as social relationships and networks that appear to decrease risk (Weitzman and Kawachi, 2000).

ISSUES FOR COLLEGE ADMINISTRATORS

College presidents nationwide view excessive drinking as their number one campus-life problem. They know that student alcohol misuse harms those students who drink to excess, negatively affects students who do not drink or drink responsibly, and damages the larger institution. Although more research is needed, findings from a number of well-designed studies offer information and suggested strategies useful for college and university administrators interested in reducing excessive drinking on campus and its consequences (Murphy, 2000).

Issues Related to Federal, State, and Local Laws

Federal, State, and local laws help define college administrators' responsibilities for taking action when students misuse alcohol. The Federal Drug-Free Schools and Communities Act and its 1989 amendments require institutions receiving any Federal funds to (DeJong and Langenbahn, 1995):

- Implement an alcohol and drug education program;
- Define a policy that prohibits the unlawful possession, use, and distribution of alcohol and other drugs;
- Share information about alcohol and drug treatment programs available to students and employees;
- Adopt disciplinary sanctions for students and employees who violate the school's policy on alcohol and drugs; and
- Ensure that the disciplinary sanctions are consistently enforced.

The amendments to the Family Educational Rights and Privacy Act now permit schools to disclose to parents any violations of local, State, and Federal laws and school policies and rules related to alcohol. Massachusetts now requires and Virginia now recommends that public institutions in those States do so.

Issues Related to Policy Development

In addition to complying with the law, each college has an obligation to define and adopt an institutional policy on alcohol that is consistent with its own culture, values, mission, and population. Because institutions are so diverse, no single policy on alcohol is appropriate for the 3,000-plus U.S. institutions of higher learning (Gulland, 1994). An institution's history, demographics, philosophy, and mission should guide the policy development process.

Numerous publications are available to help administrators review and create alcohol policies (DeJong and Langenbahn, 1995; Gulland, 1994; Pittayathikhun et al., 1997). Among the many issues to be considered are the following:

- Is the desired outcome a complete ban on the presence of all alcohol among undergraduate students, or is the focus on responsible behavior and mitigation of serious offenses?
- Will the focus be restricted to alcohol-misusing students only, or will it include those adversely affected by students who drink excessively?
- What data will be gathered and how will the data be gathered?
- How will the institution measure compliance with the policy and evaluate progress in achieving goals?

A school must also be aware of the legal aspects of any policy it institutes. To balance students' individual rights against institutional liability, some lawyers recommend the following (Gulland, 1994):

- Adopt only rules and sanctions that the school is willing and able to enforce.
- Enforce the policy consistently while respecting students' rights to fair hearing procedures.
- Emphasize education, both as a general means of informing students about the dangers of alcohol and drug use, and as a response to violations of the school's policy.

- Focus on circumstances that present the greatest danger and risk of liability—such as situations in which the school is involved in selling alcoholic beverages or acting as a social host—and recurring patterns of alcohol misuse during particular events or by repeat offenders.

Companies that provide liability insurance to colleges and universities have also made specific suggestions (United Educators Insurance Risk Retention Group, Inc., 1993). They include:

- Draft policies that encourage responsible behavior, but avoid policies that seek to prevent specific types of harm or prescribe narrow types of behavior with alcohol.
- Do not sell alcohol unless the institution is prepared to handle the responsibilities imposed by social host or dram shop laws.
- Educate groups that host parties—fraternities, residence halls, alumni—about their "host liability" for serving alcohol to underage drinkers and ways to detect overconsumption.
- Offer programs for students on the dangers of drinking and driving.
- Address known violations of institutional policies immediately and impose discipline consistently and firmly.

Issues Related to Policy Enforcement

Once an institution has defined and adopted its alcohol policy, it should consider policy enforcement and the execution of educational and other programs related to it. Depending on an institution's policy, administrators may need to focus on specific aspects of campus life; some of these are discussed below.

Residence hall life. There are many complex issues regarding residence hall life that should be considered by administrators instituting and enforcing an alcohol policy. They include the following:

- At what point is a student's right of privacy violated because of concerns about alcohol misuse?
- Does a college face legal liability if it designates a residence hall substance-free when virtually all of the institution's students are under the legal age for drinking?
- What message does the "substance-free" label on one residence hall send about the others? The label may be less "loaded" if it includes tobacco products as well as alcohol and drugs.
- If no residence hall is designated substance-free, how is the institution prepared to respond to the residential requirements of students who are in recovery from alcohol dependence and whose needs are protected by the Federal Americans with Disabilities Act?
- What is the college's policy on a "good Samaritan" rule? In a reversal of the actions of the biblical "good Samaritan," some students refuse to seek help for a student in trouble as a result of alcohol misuse for fear of punishment. A campus good Samaritan rule balances these student concerns against the law and the need to obtain help for other students when they are in serious, even life-threatening situations.

Fraternities and sororities. Because of the association between membership in a fraternity or sorority and alcohol consumption, it is clear that college administrators need to work with leaders in the Greek system when defining alcohol policy and the mechanisms for enforcing it. A balance needs to be struck between respect for the fundamental principles of self-governance that define Greek life and the recognition that fraternities and sororities are part of the larger university environment and campus

culture. College administrators should work with local chapter members to ensure that Greek alcohol use and misuse policies are consistent with those of the particular institution.

Currently, national fraternity and sorority systems set their own policies on alcohol misuse. Recently, many fraternities have banned the presence of alcohol in the fraternity house (Boston, 1998; Budoff, 1998; Burke, 1999; Williams, 1996), and seven members of the National Panhellenic Conference have voted to restrict their sororities' social commitments in fraternity houses to those chapters that offer only alcohol-free events in their houses.

An analysis of the role of alcohol in fraternities prompted the following recommendations to members of the Greek system and campus administrators (Arnold and Kuh, 1992):

- Conduct cultural audits of local chapters using insiders and outsiders.
- Adopt culture-change strategies and tactics.
- Hold members of the local chapter responsible for bringing about cultural change.
- Defer rush until the end of freshman year or the beginning of sophomore year so college students experience a broad exposure to campus culture before they choose to become members of the Greek system.
- Increase efforts to recruit members from historically underrepresented racial and ethnic groups, groups that tend to drink less.
- Select live-in advisors committed to the institutional mission and cultural change.
- Eliminate organizations with harmful cultural and lifestyle patterns that are unwilling or unable to change.

The role of athletics. College athletics can contribute to alcohol problems for the campus and the surrounding community in a number of ways (Ryan, 1999). Weekly alcohol consumption and binge drinking go up as a student progresses from noninvolvement in collegiate or recreational athletics to participation on a team and a leadership position. At many institutions, alcohol is intimately associated with athletics. The alcohol industry may provide financial support for big-time athletic programs and related large-scale campus events; alcohol may be available in college sports arenas; and new college stadiums may include luxury boxes for alumni and other supporters where alcohol is served.

The following recommendations emerged from a 1999 symposium on collegiate athletics and alcohol sponsored by The Higher Education Center for Alcohol and Other Drug Prevention (Ryan, 1999):

- The National Collegiate Athletic Association should reassess its policies for accepting alcohol advertising and event sponsorship.
- Colleges should enforce consistent alcohol control measures for public events (e.g., pregame tailgating and in-stadium alcohol availability) to avoid double standards for alumni and students.
- Colleges should engage their surrounding communities in collaborative efforts to prevent alcohol misuse associated with athletic events.
- Colleges should reduce risks posed by postgame celebration (for wins) and consolation (for losses) occasions by hosting social gatherings that do not involve alcohol.
- Colleges should examine the pros and cons of accepting financial support from the alcohol industry.

Alumni events and fundraising. Alumni events represent a particularly challenging area for college administrators. While virtually all alumni are of legal age to drink, the extent to which they misuse alcohol when they return to campus can have serious consequences for the college or university. Students are quick to note double standards and hypocrisy and readily pick up on the fact that excessive drinking by alumni is tolerated while alcohol misuse by students is not. When the president of the University of Rhode Island changed the institution's policy to ban alcohol from all campus functions, some of the most vocal resistance (besides fraternities) came from the development office staffers and deans, who were worried that the lack of alcohol could adversely impact fundraising and development activities (Schroeder, 1999). In fact, the president reported little or no resistance from alumni and no negative impact on development (Mara, 2000). Nevertheless, the extent to which there could be negative effects on development from changes in alcohol policies is an issue meriting further study.

Another difficult question is whether to accept gifts or sponsorships from the alcohol industry (Ryan, 1999). President Edward H. Hammond of Fort Hays State University is among those who believe the alcohol industry should be part of the solution, not part of the problem. He said, "Every time a legal product is abused in our society, we demand the producers of the product take ownership and be a part of the solution" (Ryan, 1999). He cited the automobile industry and chemical companies as examples.

For institutions that have hospitality programs or food-related curricula, or alumni who have entered the alcohol industry after graduation, the two issues—alumni giving and industry support—come together. The college or university must be clear in articulating its position, especially about alcohol advertising on campus, accepting gifts, and allowing support from the industry. It is possible to prohibit the direct advertisement of alcohol or official sponsorship of an event by the alcohol industry and still accept gifts from manufacturers or retailers of beer, wine, and liquor products.

Taking Concrete Action To Change the Culture of Drinking on Campus

Research indicates that the most successful strategies for changing student drinking behavior are likely to be multidimensional (Final Report of the Panel on Prevention and Treatment). Such strategies should take into account existing laws, an institution's own alcohol policy, and the people likely to be affected by enforcement of that policy. Although additional research is needed to answer important questions about many aspects of excessive student drinking, a number of colleges and universities are using a combination of strategies to begin changing the culture of drinking on campus. Those strategies include involving stakeholders, offering a range of substance-free social programs, conducting communications campaigns, managing special events, and building campus-community coalitions. College administrators may find elements of each useful in planning their campus alcohol programs.

Involving stakeholders. Most effective programs involve stakeholders—a group that at a minimum includes students, the school president, and faculty—as a first step in developing a campuswide approach to reducing excessive student drinking.

- **Students.** The key stakeholder in changing a college culture of alcohol misuse is the student. Students have the opportunity—and perhaps the obligation—to be advisers and advocates in bringing about healthy cultural change. The most successful change is likely to occur when it is student-driven and supported by the administration. Students can hold themselves accountable for the campus alcohol policy; monitor their own behavior in a way that exercises self-governance and accepts responsibility; communicate information on the topic through campus newspapers; and initiate social programming that does not include alcohol, especially in the critical and influential first month of school (Gomberg, 1999; Gulland, 1994; Upcraft, 2000).

- **College presidents.** The college president is another important stakeholder in reducing campus alcohol misuse. The role of the chief executive has been delineated by the Presidents Leadership Group (1997), which encourages presidents to adhere to the "three Vs": be vocal, be visible, and be visionary. The group offers the following specific recommendations for college presidents (DeJong, 1998; Presidents Leadership Group, 1997):
  - Work to ensure that school officials routinely collect data on the extent of alcohol misuse and make this information available when appropriate.
  - Frame discussions about alcohol in a context so that other senior administrators, faculty, students, alumni, and trustees will understand clearly that excessive drinking interferes with the pursuit of academic excellence that drives the institution.
  - Define alcohol not as a problem of the campus alone, but of the entire community, one that will require community-level action to solve.
  - Use every opportunity to speak out and write about alcohol and other drug misuse to reinforce prevention as a priority concern and to push for constructive change.
  - Work to ensure that all elements of the college community avoid providing "mixed messages" that might inadvertently encourage alcohol and other drug use.
  - Demonstrate commitment to alcohol and other drug abuse prevention by budgeting sufficient resources to address the problem.
  - Appoint a campuswide task force that includes other senior administrators, faculty, and students; has community representation; and reports directly to the president.
  - Appoint other senior administrators, faculty, and students to participate in a campus-community coalition that is mandated to address alcohol and other drug use issues in the community as a whole.
  - Lead a broad exploration of the institution's infrastructure and the basic premises of its educational program to see how they affect alcohol and other drug use.
  - Offer new initiatives to help students become better integrated into the intellectual life of the school, change student norms away from alcohol and other drug use, and make it easier to identify students in trouble with alcohol and substance use.
  - Take the lead in identifying ways to promote economic development in the community, since a community with a broad economic base will be less reliant on selling alcohol to college students to produce revenue.
  - Be involved, as private citizens, in policy change at the State and local level, working for new laws and regulations that will affect the community as a whole.
  - Participate in State, regional, and national associations to build support for appropriate changes in public policy.
- **Faculty.** A survey conducted by the Core Institute showed that more than 90 percent of faculty and staff are concerned about the impact of students' alcohol and other drug use (cited in DeJong, 1998). Faculty can play a vital role in effecting change by:
  - Ensuring that classes are held Monday through Friday, not Monday through Thursday; when the academic week is short, it can encourage the early start of a long weekend devoted to partying.

- Infusing the curricula with information on alcohol misuse, when appropriate, to engage students in this issue (Ryan and DeJong, 1998).

Ensuring adequate staffing. A coalition of staff is needed to effectively reduce alcohol misuse on campus. Coalition members need to be able to link with health professionals, campus police, judicial staff, and students to connect students with alcohol problems to appropriate interventions. Coalition leadership should have direct access to the college president. If institutional change is to occur, it cannot be led by a staff person buried deep in the organizational bureaucracy of the college or university.

Offering social programming. The type and amount of social programming play a significant role in students' use and misuse of alcohol. One of the most controversial issues is whether to have a campus pub. Although an on-campus pub offers opportunities for oversight, it may also be a liability because the college is acting as a host in the provision of alcoholic beverages (Gulland, 1994). The college should be sure it offers student-friendly social activities throughout the week that do not involve alcohol; many college students appear to be seeking a high-energy, social and recreational program that follows their biological clock, not that of the overseeing staff. The University of West Virginia and the University of North Carolina are among the institutions that have been successful in offering all-night activities that meet students' desires. Key to the success of this type of nonalcohol social programming is the role that students themselves play in taking the lead by planning and sponsoring such events (Schroeder, 1999).

Conducting communication campaigns. Colleges and universities are engaging in communication campaigns to reduce excessive drinking. Some institutions focus on the consequences of alcohol misuse to the users themselves, while others try to motivate change by empowering those affected by secondhand effects. Although traditional efforts offer information about alcohol use, including the devastating and dangerous effects of alcohol misuse (death, serious injury, rape), newer campaigns feature the social norms approach, which emphasizes the more moderate behavior that is typical of the student population at large, rather than worst-case examples. (More detailed descriptions of informational and social norms approaches are provided in the Panel 2 report.) A communication campaign can be based not just on individual intervention strategies but also on strategies at the social system level, which includes institutional, community, and public policy levels. At the core of the social systems approach is the belief that people make decisions about alcohol use based on the physical, social, economic, and legal environment, not just on personal needs (DeJong, 1998).

Managing special events. Highly populated special events such as football tailgating, homecoming, special weekends, and senior celebrations are often marked by excessive drinking. The "just say no" approach—simply mandating that such events cannot occur—does not work and can have disastrous results (Cohen, 1997; Zimmerman, 1999). A more helpful approach is to involve students in planning these events from the beginning, sharing with them the need to prevent harmful consequences that can occur from alcohol misuse. Although these honest, open discussions can make admissions officers, public relations personnel, and college legal staff nervous, without an honest assessment of the damage that can result from such gatherings and a genuine commitment to change, nothing constructive will happen and entrenched behavioral patterns will continue.

Building coalitions. Building campus-community coalitions involves a need to be honest and open. To form an effective coalition, college officials need to talk honestly about unmonitored serving in the local bars where identification is not required, the impact of advertising low-priced drink specials, and the overall campus drinking problem. Such honesty can expose the college to potential litigation or "bad press," but without such candor, the attention of community leaders and their help and cooperation are almost impossible to obtain. Such coalitions can be powerful forces for change. In one experiment, two communities in California and one in South Carolina organized citizen-led programs for more effective

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control of alcohol sales. In contrast to the comparison sites, participating communities cut alcohol sales to minors in half and reduced single-vehicle accidents by 10 percent (DeJong, 1997; Holder et al., 2000). Although the risk of public exposure of problem student-drinking behavior exists, taking a stand and reaching out to work with the community can have a highly positive outcome (Schroeder, 1999).

Strategies for Filling Gaps in Knowledge: Alcohol-Reduction Efforts

College administrators need to develop, use, and continually evaluate research related to their own campus and community. This will enhance knowledge about the effectiveness of program interventions and the differential vulnerability of specific populations on campus. In addition, it is important to monitor the image of the college that is being presented through its materials, student academic performance, and campus incidents related to alcohol use and misuse. The college should also attempt to determine the various costs related to alcohol misuse by students on campus. Although very little research is available in this area, some guidance may be available from recent national studies (Levy et al., 1999; Wechsler et al., 2000c). Focus group research can augment understanding of trends identified in surveys of campus populations. Ongoing program evaluations within the institution are crucial to assess the success and impact of any interventions that are developed and initiated by college administrators to reduce alcohol misuse on campus. To design a program once and assume it will continue to be useful, effective, and relevant for years to come is unrealistic.

RESEARCH CONSIDERATIONS

Numerous and varied factors contribute to and sustain heavy episodic drinking among college students. They include the student and his or her background; the developmental tasks that accompany this phase of life; the peer group on campus; the particular college's rituals and traditions; and the community environment, including alcohol supply and alcohol marketing practices. The heterogeneity that exists among institutions and students means that findings from studies conducted on one campus, or even on a few campuses, may not be generalizable to other institutions.

College students and their drinking behavior have now been studied for at least 50 years. The pioneering work of Straus and Bacon (1953), *Drinking in College*, is a milestone in this area, and served as a starting point for hundreds of subsequent studies. Since then, substantial methodological progress has been made in measuring college student drinking.

Like any complex human behavior, drinking among college students is best approached as part of a multifaceted system with many elements. Research processes try to balance this inherent complexity against the need to construct specific study designs that are feasible and that address specific research questions. The major approaches used to study drinking behavior in college include exploratory research, descriptive research, explanatory research, and evaluation research (Dowdall and Wechsler, 2002).

Exploratory Research

Exploratory research attempts to understand some problem or area of study in a preliminary way. Research designs for exploratory research often rely on direct observation of a limited number of examples of what is to be studied—in this case, drinking behavior in college. Focus groups, which bring together a small group of subjects to engage in a guided discussion about a limited issue, are an example of exploratory research. Although exploratory studies do not and are not intended to provide precise estimates of the prevalence of a problem or to test specific theories, they can be invaluable in mapping domains of study or clarifying the feasibility of specific research strategies and tactics.

Descriptive Research

Descriptive research usually attempts to examine a few well-developed constructs in detail in an effort to estimate the frequency with which certain behaviors, such as drinking, or relevant characteristics occur in a given population. Descriptive research should consider and attempt to adjust for any bias that could distort a study's findings such as skewed participation by a particular population subgroup. An example of descriptive research is a survey of the prevalence of specific drinking practices.

Explanatory Research

Explanatory research attempts to investigate the causes of particular phenomena, not simply to describe them. Such research carefully tests causal hypotheses (Campbell and Stanley, 1963; Cook and Campbell, 1979; Dowdall et al., 1999). It also rules out rival explanations, including:

- **Maturation** (e.g., does drinking decrease after college because students leave a drinking-supportive environment or because of an age-graded phenomenon that affects students and their nonstudent peers equally?)
- **Chance** (i.e., does an association between two variables exceed what would be expected based on their independent distributions in the population?)
- **Methodological artifacts** (i.e., is the relation between two variables attributable, in part, to common methodological influences, such as social desirability biases in self-report, or inadvertent common content overlap among measures being correlated?)
- **Spuriousness** (i.e., are two variables related not because of a causal or other one-to-one association between them but because they are both influenced by a common third variable?) For example, students who drink heavily tend to report lower grades and have more academic problems; however, much of this association may be explained by precollege academic achievement (Wood PK et al., 1997).
- **Directionality** (i.e., is a variable a cause or a consequence of drinking?) For example, a study that attempts to demonstrate a causal influence of fraternity or sorority membership on student drinking needs to address the rival hypothesis of self-selection. That is, students who join Greek organizations may already be heavy drinkers who seek the heavy-drinking lifestyle associated with fraternity or sorority membership.

Evaluation Research

Evaluation research attempts to explore whether a given program, such as one instituted to lower alcohol use by college students, is achieving its stated goals. Process evaluation examines whether the program is operating as planned, whereas outcome evaluation assesses whether the program achieves the impact or effects that were planned for it.

Issues in Research Design

The specific study designs used by researchers can affect the findings that are produced (Dowdall and Wechsler, 2002). Issues that must be considered in the design of research to measure drinking among college students include:

- Unit of analysis that is used (e.g., the student, categories of students, the college);
- Types of students and universities selected for study;
- Diversity among institutions;

- Whether the study design is longitudinal or cross-sectional;
- Type of data collected;
- Sampling techniques and the size of the population samples; and
- Validity of the data, including the reliability and validity of self-reports.

Although the validity of self-reported alcohol use and problems is a legitimate concern, most validation studies show that self-reports are basically accurate. Not surprisingly, given the limitations of human memory, reports of recent alcohol consumption tend to be more accurate than reports of long-term patterns of use (Babor et al., 1987; Harris et al., 1994; Midanik, 1988).

Just as binge drinking rates vary widely, so do the institutional characteristics of the thousands of colleges and universities in the United States. The broad organizational diversity of higher education poses challenges in study design as institutional factors may influence research findings. The researcher must ensure that a study sample is representative of the college or university (or subgroup of students) that is being studied. Care must be taken not to generalize from samples that are not representative, and comparisons over time must be made cautiously as higher education and the college student population in the United States have changed over the years (Dowdall and Wechsler, 2002).

Ideally, researchers would like to study change over time (longitudinal studies) to identify trends in a behavior, such as drinking among college students. Issues of cost and practicality often limit use of this option. Although there are few longitudinal studies of college drinking, those that exist elucidate patterns of stability and change over time, such as the increased risk of alcohol-related problems in middle age associated with earlier alcohol-related problems in college (Vaillant, 1996).

Data Collection

Surveys, using both questionnaires and interviews, and focus groups have been used with varying success to collect information about alcohol use among college students. Surveys can be conducted face to face, by mail, by telephone, and over the Internet.

Several large national data sets (see Epidemiology of Alcohol Use Among College Students, p. 8) are available for researchers conducting secondary analyses of data already collected and stored in accessible databases. An excellent summary of these generally high-quality data sets has been published (Larson et al., 1995). In addition, the Internet has made access to these databases much easier, and many of them have their own Web sites.

Linking Alcohol Use to Harmful Outcomes

Research on alcohol use among college students tends to employ measures indicating heavy episodic use. This pattern of drinking has come to be known as binge drinking, a term akin to "eating binges" and "shopping binges" that denotes a particular behavioral pattern occurring over a relatively short period (see Glossary of Alcohol Terminology, p. 6).

Research studies that link alcohol use in college to health and behavioral consequences have examined primary effects for the heavy-drinking college student, such as missing a class, being unable to study, or having unprotected sex, and secondary effects from others' drinking, such as being physically assaulted or having study time interrupted. Self-report measures have been used to assess academic consequences, drinking and driving issues, and abuse or dependence.

Several short screening forms for alcohol-related problems that were originally developed for clinical practice have been used in college studies. These include the CAGE Questionnaire, which is composed of four fairly severe indicators of alcohol dependence (Mayfield et al., 1974), and the Michigan Alcoholism Screening Test, composed of 24 items sampling various problems and dependence symptoms (Selzer, 1971). More recently, assessments of alcohol dependence symptoms and problems tailored to college students and other young adults have been developed. These include the 23-item Rutgers Alcohol Problem Index (White and Labouvie, 1989) and the 27-item Young Adult Alcohol Problems Screening Test ((Hurlbut and Sher, 1992). Summaries of these and other problem drinking assessments can be found in NIAAA's Treatment Handbook *Assessing Alcohol Problems: A Guide for Clinicians and Researchers* (NIAAA, 1995). It is important to note that the self-reported prevalence of self-perceived alcohol problems (e.g., "Do you think you have an alcohol problem?") is relatively low even among those who report experiencing severe consequences of drinking. This suggests the need to assess objective problems (e.g., blackouts, fights, and injuries) as well as a student's self-assessment of his or her drinking problems. Research designed to assess alcohol abuse and dependence among college students is a high priority because of the critical importance of identifying students who may need formal treatment for alcohol problems (see Glossary of Alcohol Terminology, p. 6).

Strategies for Filling Gaps in Knowledge: Methodology

The studies of college drinking conducted over the past 50 years are uneven. Although many meet high scientific standards, not all have adhered to rigorous research designs, and weak studies have often drawn inferences that cannot be strongly supported. This variability in study quality affects both internal validity (i.e., how confidently inferences can be drawn about the relationships among variables in the study undertaken) and external validity (i.e., how generalizable the findings are to different campuses or subpopulations of students). In recent years, research on college drinking has become more sophisticated and rigorous. Solicitations (e.g., program announcements, requests for applications) from NIAAA, other Federal agencies, and private foundations could accelerate improvements in the quality of research on college drinking by ensuring that projects important to the field meet high scientific standards.

SUMMARY AND CONCLUSIONS

The problem of excessive drinking by college students is entrenched, complex, and multifaceted. Drinking in college has the potential to cause considerable harm to the students who drink and to those around them. Excessive drinking also negatively affects institutional property, community property, and the institution's academic and financial well-being.

Ongoing scientific research to fill gaps in knowledge about this important public health problem—especially longitudinal studies that track trends over time—is needed to guide policies and programs to reduce excessive alcohol use among college students. Carefully designed research on alcohol consumption by college students can separate myth from fact, explain incompletely understood behavior, illuminate the reasons for inconsistent findings from previous studies, and suggest promising preventive strategies based on evidence and outcomes. Prevention programs built on a foundation of scientifically defensible practices are more likely to be successful.

On the basis of the papers it commissioned and its 18 months of deliberations, the Panel on Contexts and Consequences determined that the following general conclusions can be drawn from the research on college student drinking:

Epidemiology

- About two out of five college students report consuming five or more (four or more for females) drinks in a row at least once in the past 2 weeks;
- Many students experience a range of alcohol-related problems;
- Many students who drink heavily do not perceive their problem;
- There is heterogeneity in drinking trajectories across the college years; and
- Patterns and rates of drinking and drinking-related problems vary by race and gender.

Etiology and Context

- Prior drinking history is related to alcohol consumption in college;
- Drinking behavior should be looked at in a broad contextual manner;
- Peer pressure and self-selection are major factors in explaining differences in drinking levels across different social groups;
- The presence of a Greek system, the prominence of athletics, type of residence halls, type of school (e.g., historically Black college, women's college), geographic region, and religious affiliation, if any, are associated with drinking patterns on campus; and
- Belonging to a Greek house and participating in college athletics are associated with heavier drinking.

Consequences

- The consequences of drinking by college students are numerous and varied;
- Personal consequences range from hangover or missing class to traumatic injury or fatal alcohol poisoning;
- Drinking by college students creates "secondhand" consequences for nondrinkers and the larger community, including noise, litter, vandalism, and an increased need for services of various kinds (e.g., security, maintenance);
- There is an association between alcohol consumption and aggressive behavior;
- Drinking increases the risks for being both a victim and a perpetrator of a crime, including sexual assault; and
- Unrealistic attitudes among women and men about their relative invulnerability may predispose them to sexual assault and the consequences of high-risk sex.

Opportunities for Intervention

- Alcohol misuse is a modifiable behavior;
- Effective interventions are available for changing alcohol-related behavior patterns;
- The multiple transitions college students are experiencing represent windows of opportunity for intervention;
- Alcohol misuse in college is a complex, multifaceted problem that is influenced by many variables; successful approaches to preventing it are likely to be similarly complex and multifaceted;

- A clearly defined mission and statement of values should shape campus policies and programs designed to reduce alcohol consumption;
- Forming coalitions involving all stakeholders—including Greeks, athletes, and other students—supported by the college president is a promising approach to preventing college alcohol misuse; and
- An agenda for change should incorporate needs assessment and include an evaluation mechanism for any strategies to be implemented.

As with other complex and entrenched human behaviors, changes in alcohol consumption on college campuses will likely require a broad-based socioenvironmental and economic effort that is sensitive to individual student freedoms and campus culture and that is implemented in ways that promote acceptance by relevant constituencies. College students themselves should have an opportunity to participate with college presidents, staff, faculty, and representatives of the surrounding community in a rational decision-making process aimed at reducing alcohol misuse and its consequences. A primary outcome of such a process is an institution-specific plan to assess and change the campus cultural norm from widespread acceptance of underage and excessive drinking to one of support for healthy social gatherings and responsible drinking behavior.

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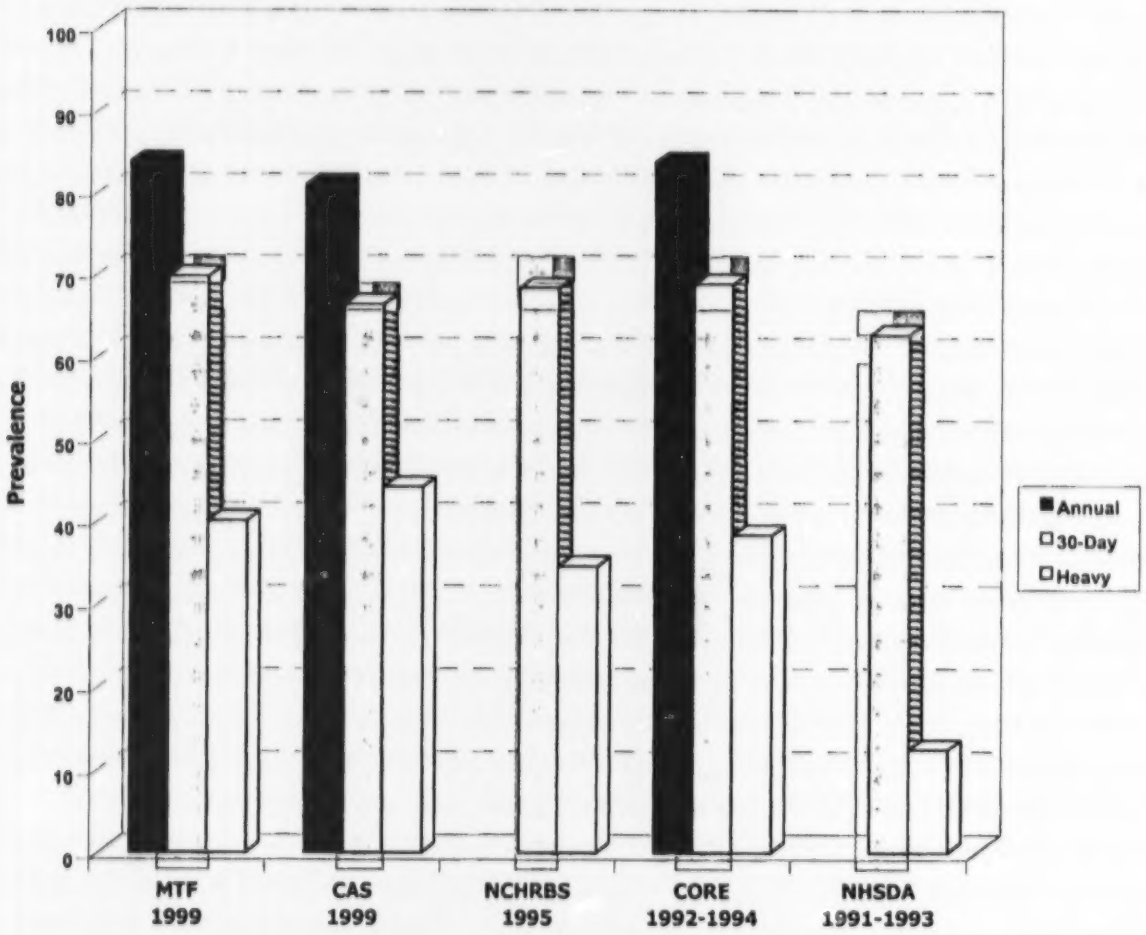
Appendix
Figures

Figure 1. Prevalence of annual, 30-day, and heavy alcohol use among college students

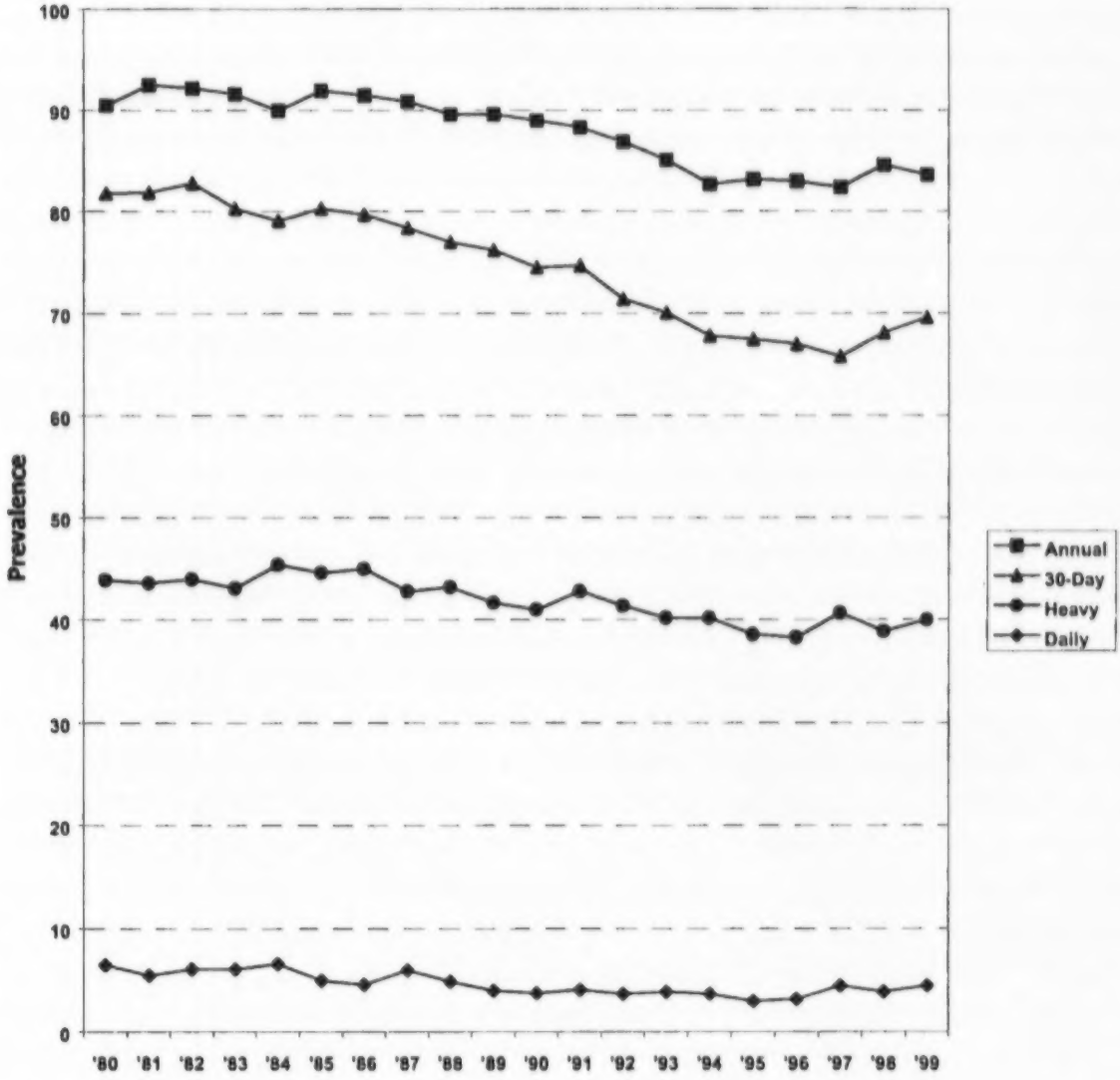


Source: Monitoring the Future (MTF)
The Harvard School of Public Health College Alcohol Study (CAS)
The National College Health Risk Behavior Survey (NCHRBS)
The Core Institute (CORE) Alcohol and Drug Use Survey
The National Household Survey on Drug Abuse (NHSDA)

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

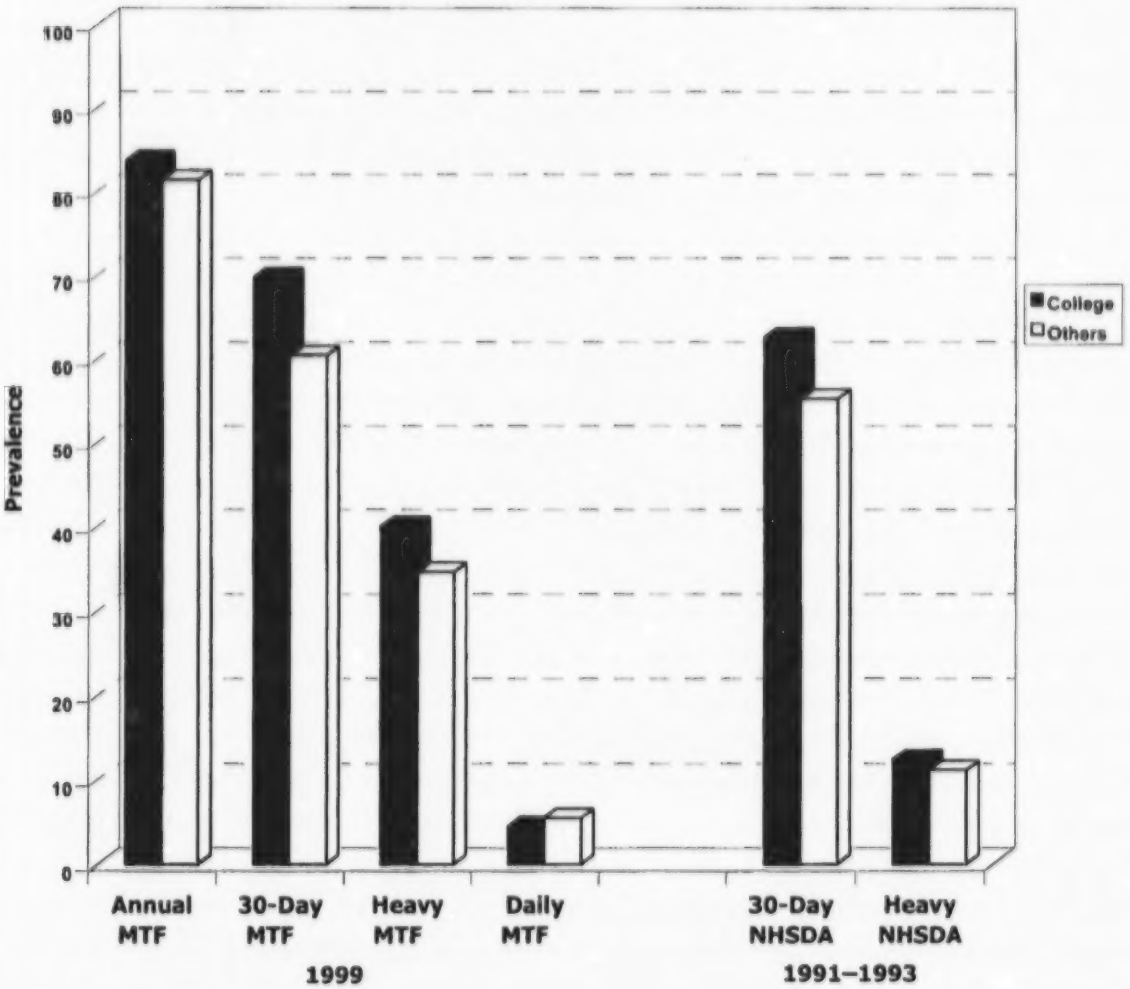
Figure 2. Trends in annual, 30-day, heavy, and daily alcohol use among college students, 1980–1999



Source: Monitoring the Future (MTF)
From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–9 for more information about this survey.)

Figure 3. Prevalence of annual, 30-day, heavy, and daily alcohol use among college students and noncollege students

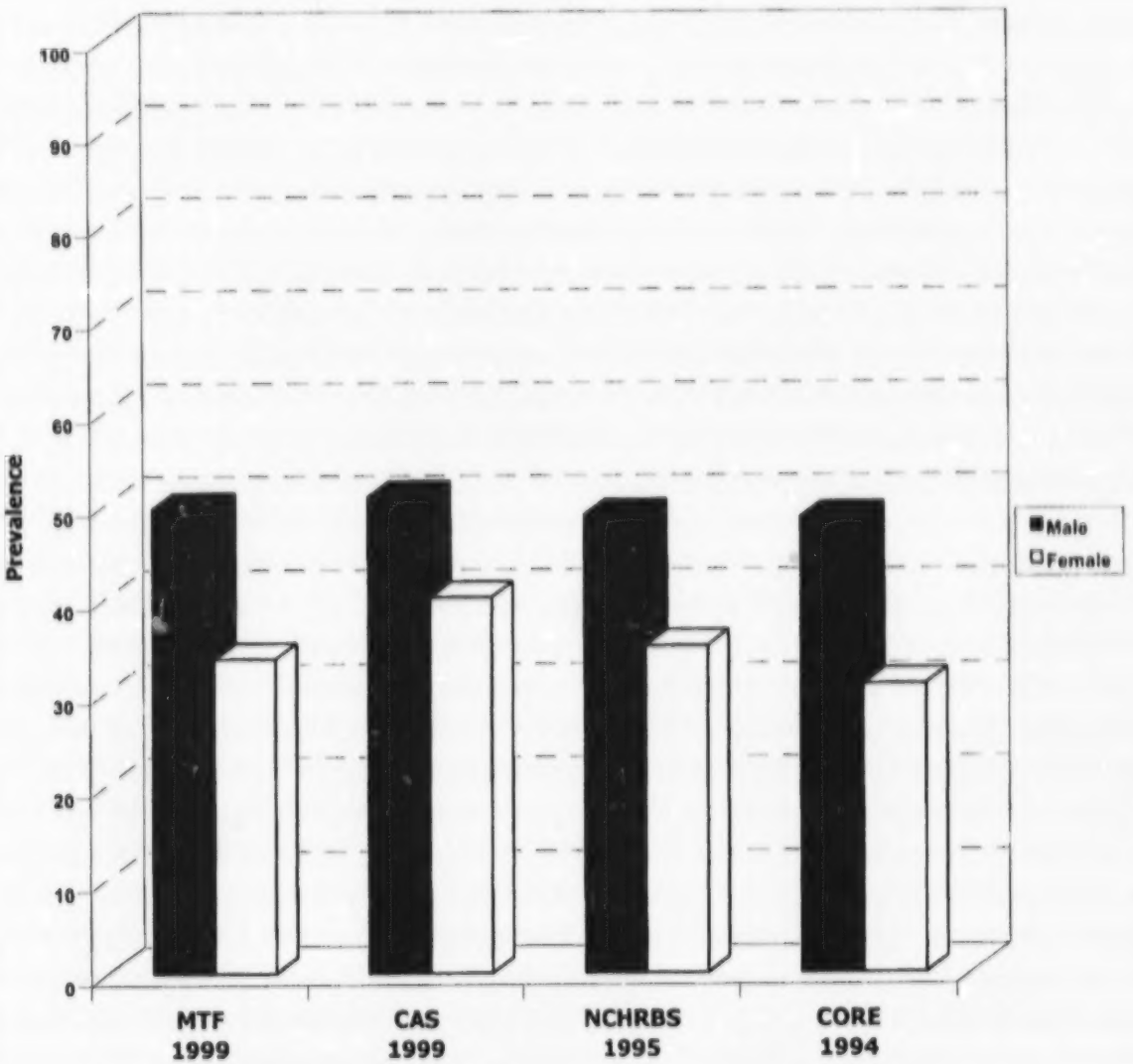


Source: Monitoring the Future (MTF)
The National Household Survey on Drug Abuse (NHSDA)

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

Figure 4. Prevalence of heavy drinking among college students by gender

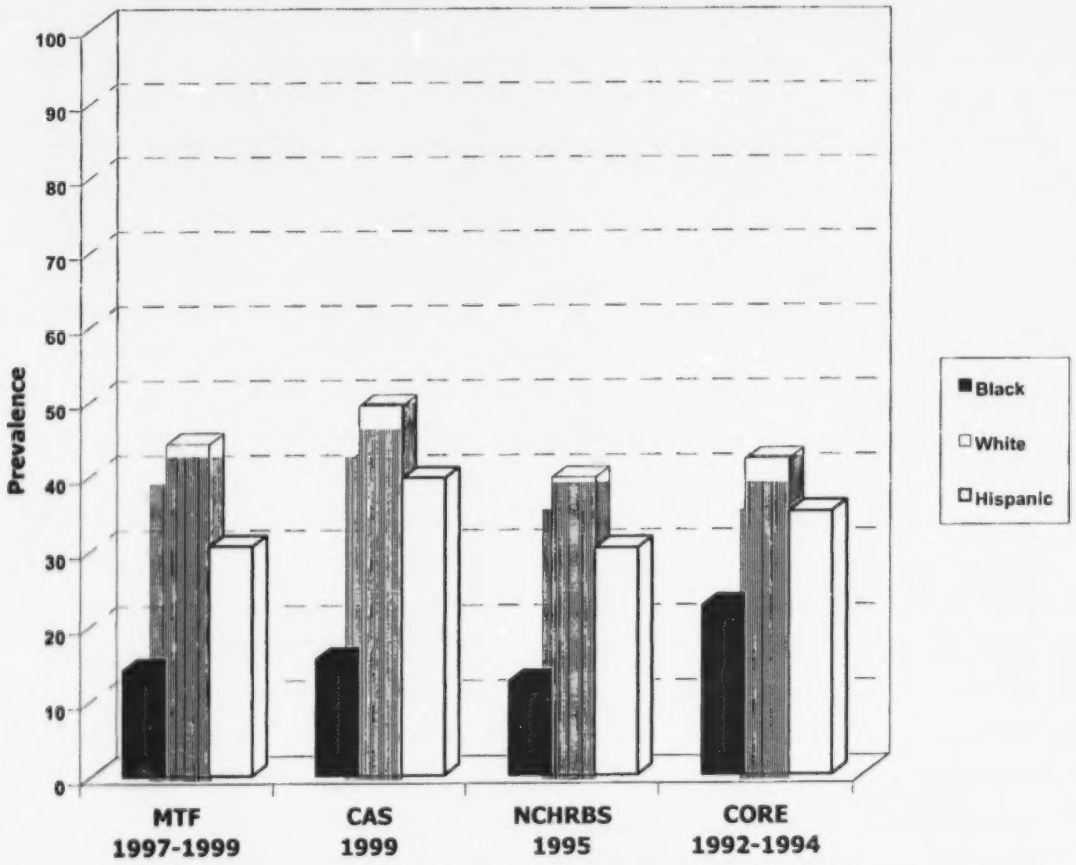


Source: Monitoring the Future (MTF)
The Harvard School of Public Health College Alcohol Study (CAS)
The National College Health Risk Behavior Survey (NCHRBS)
The Core Institute (CORE) Alcohol and Drug Use Survey

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

Figure 5. Prevalence of heavy drinking among college students by race/ethnicity

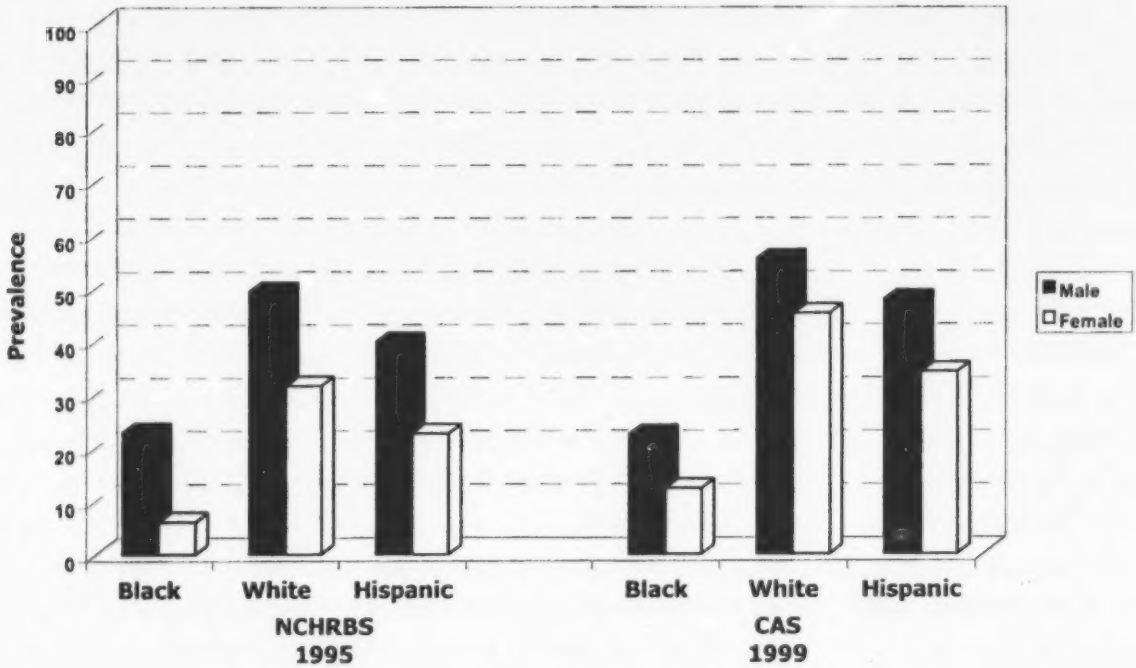


Source: Monitoring the Future (MTF)
The Harvard School of Public Health College Alcohol Study (CAS)
The National College Health Risk Behavior Survey (NCHRBS)
The Core Institute (CORE) Alcohol and Drug Use Survey

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

Figure 6. Prevalence of heavy drinking among college students by gender and race/ethnicity

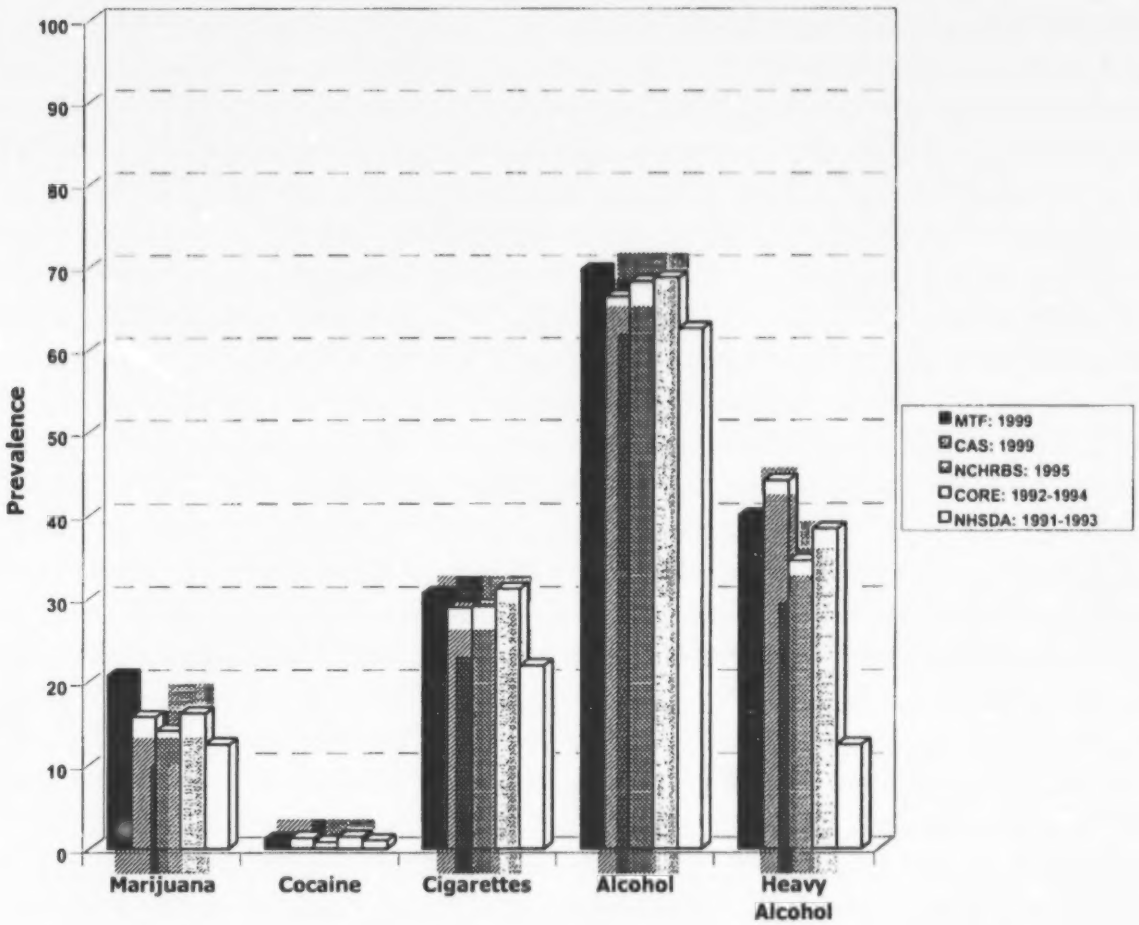


Source: The National College Health Risk Behavior Survey (NCHRBS)
The Harvard School of Public Health College Alcohol Study (CAS)

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

Figure 7. Prevalence of current* use of marijuana, cocaine, cigarettes, and alcohol among college students



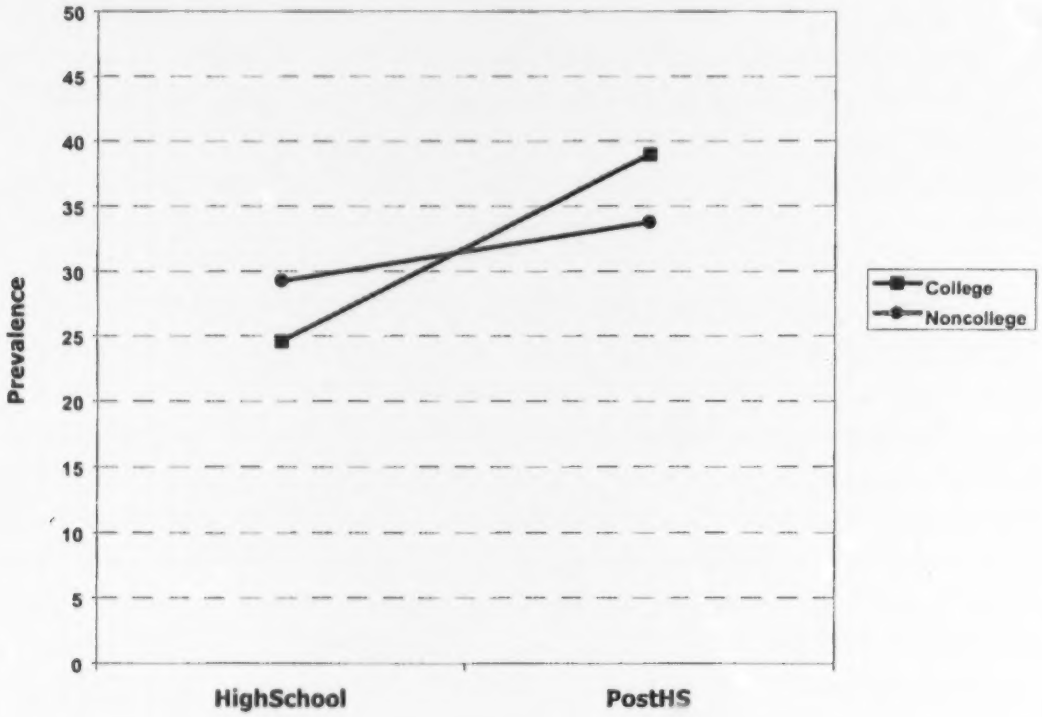
Source: Monitoring the Future (MTF)
The Harvard School of Public Health College Alcohol Study (CAS)
The National College Health Risk Behavior Survey (NCHRBS)
The Core Institute (CORE) Alcohol and Drug Use Survey
The National Household Survey on Drug Abuse (NHSDA)

From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–10 for more information on these surveys.)

* within the last 30 days

Figure 8. Change in heavy drinking from high school senior year to post high school by college student status (MTF, 1997–1999 combined)



Source: Monitoring the Future (MTF)
From: O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol Supplement* 14:23–39, 2002.

(See pages 8–9 for more information about this survey.)

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